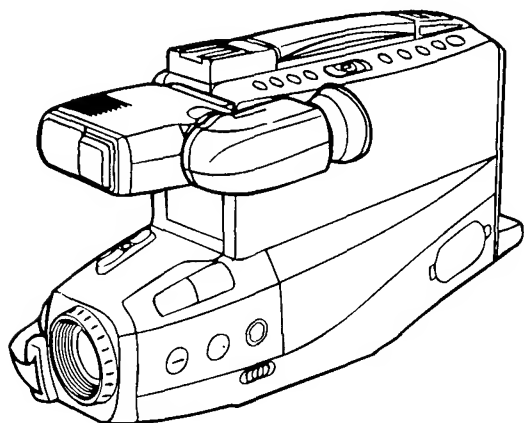


# HITACHI

## SERVICE MANUAL



V19628

TK

No.6703E

### VM-7380E

AC Adapter/Charger VM-ACV23E

### PCF-9 MECHANISM

This model uses a PCF type mechanism. When servicing the mechanism, use this manual with the PCF-9 Mechanism Service Manual (No. 6704E). (This manual includes the new exploded view in Chapter 4.)

**VHS**

This video deck is a VHS type video recorder. For proper operation, only the VHS type cassette must be used.

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

## VIDEO CAMERA/RECORDER

November 1997

Image & Information Media Systems Division, Tokai

### CAUTION

Lithium battery; danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the equipment manufacturer. Discard used batteries according to manufacturer's instructions.

When replacing the lithium battery it is important to use the same type and connect it correctly.

- WARNING:
- Lithium batteries contain dangerous chemicals.
  - Handle and dispose of with great care.
  - Do not throw in a fire.
  - Do not short circuit it.
  - For disposal place in a plastic bag and put in waste bin.

### PRODUCT SAFETY NOTICE

Many electrical and mechanical parts have special safety-related characteristics. These are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for a higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Service Manual. Electrical components having such features are identified by marking with a  $\triangle$  on the schematics and the parts list in this Service Manual. The use of a substitute replacement component which does not have the same safety characteristics as the HITACHI recommended replacement one, shown in the parts list in this Service Manual, may create shock, fire, or other hazards. Product safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the current HITACHI Service Manual. A subscription to, or additional copies for, HITACHI Service Manual may be obtained at a nominal charge from HITACHI SALES CORPORATION.

### CAUTION (CRT EVF)

Be careful of the section painted in white on the electronic viewfinder circuit board as it generates a high voltage.

### X-RAY RADIATION

The primary source of X-ray radiation in this viewfinder is the picture tube. The tube used in this viewfinder is specially constructed to limit X-ray radiation emission. For continued X-ray radiation protection, the replacement tube must be same type as the original, Hitachi approved one.

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# CHAPTER 1      GENERAL INFORMATION

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## 1. SPECIFICATION

### ■ General

Power requirements	9.6V DC
Power consumption	7 watts (in the manual focus mode)
Operating temperature	0°C to 40°C
Operating humidity	< 80%
Storage temperature	-20°C to 60°C
Dimensions	108 (W) x 213 (H) x 334 (D) mm
Weight	2.0 kg

### ■ Video recorder section

Format	VHS
Record/playback system	2 video record/playback heads plus one flying erase head
Video signal	PAL colour & CCIR monochrome signals 625 lines
Tape speed	23.39 mm/sec.
Recording time	240 minutes with an E-240 cassette (SP)
Video output	1.0 Vp-p, 75 ohm
Video input	1.0 Vp-p, 75 ohm
Mic input	- 68 dBs, more than 1K ohm
Audio output	- 7.8 dBs (316 mVrms), less than 1 kohm
Audio input	- 7.8 dBs (316 mVrms), less than 47 kohm
Fast forward/rewind time	Less than 8 minutes with E-180 cassette

### ■ Camera section

Scanning	625 lines/50 fields/25 frames
Required minimum illumination	0.3 lux
Camera device	1/4" CCD
Lens diameter	46 mm
Viewfinder	2/3" B/W



## 2. COMPARISON WITH PREVIOUS MODEL

ITEM		VM-2980E(AU)/(AV)	VM-7380E(AU)/(AV)
GENERAL	Power Requirements	9.6V DC	
	Power Consumption	7 watts (in the manual focus mode)	
	Dimensions (W x H x D)	108 x 213 x 334 mm	
	Weight	2.0kg	
VIDEO RECORDER SECTION	Format	VHS	
	Record/Playback System	2 video record/playback heads plus a flying erase head	
	Video Signal	PAL colour & CCIR monochrome signal 625 lines	
	Tape Speed	23.39mm/sec.	
	Video Input	1.0Vp-p, 75 ohm	
	Video Output	1.0Vp-p, 75 ohm	
	Audio Input	-7.8dBs (316mVrms), less than 47 k ohm	
	Audio Output	-7.8dBs (316mVrms), less than 1 k ohm	
	Fast Forward/Rewind Time	Less than 8 minutes with E-180 cassette	
	Head Wheel	62mm	
	Basic Chassis Type	PCF-7	PCF-9
CAMERA SECTION	Scanning	625 lines/50 fields/25 frame	
	Required Minimum Illumination	1 lux	0.3 lux
	Camera Device	1/4" C.C.D	
	Lens Diameter	46mm	
	Zoom Ratio/Aperture	12 : 1 (4.0 - 48.0mm)	16 : 1 (4.0 - 64.0mm)
	Aperture	F1.6	F1.4
FEATURES	Electronic Viewfinder (EVF)	2/3" B/W (CRT)	
	White Balance	AI/Fuzzy automatic white balance	
	PAL/PAL60 Switch	No (Auto. select)	
	PAL/MESECAM Switch	No (Auto. select)	
	INST. ZOOM Function	Yes (x 1.5)	
	Electrical Zoom Function	Yes (x 100)	Yes (x 130)
	Autofocus System	Video AF System	
	Program AE (Shutter Speed)	Yes (Program AE only)	
	Fade	Yes	
	Manual Focus	Yes (Auto/Manual selective)	
	Titler	Yes (1 Page + Auto. title)	
	DC Camera Ligth	Built-in	
	Wind Switch	No (Automatic compensate)	
	MIC MIX Switch	No	
	AV OUTPUT/INPUT Jack	US-pin jack (Input/Output selective)	
	EXT. Microphone Jack	Yes	
	Earphone Jack	No	
ACCESSORY	AC Adapter/Charger	VM-ACV22E	VM-ACV23E
	Battery Pack	VM-BP66	
	AV Output Cable	Monaural Type (Parts No. EW10942)	

### 3. COMPARISON OF MAIN CCONTROL ICs

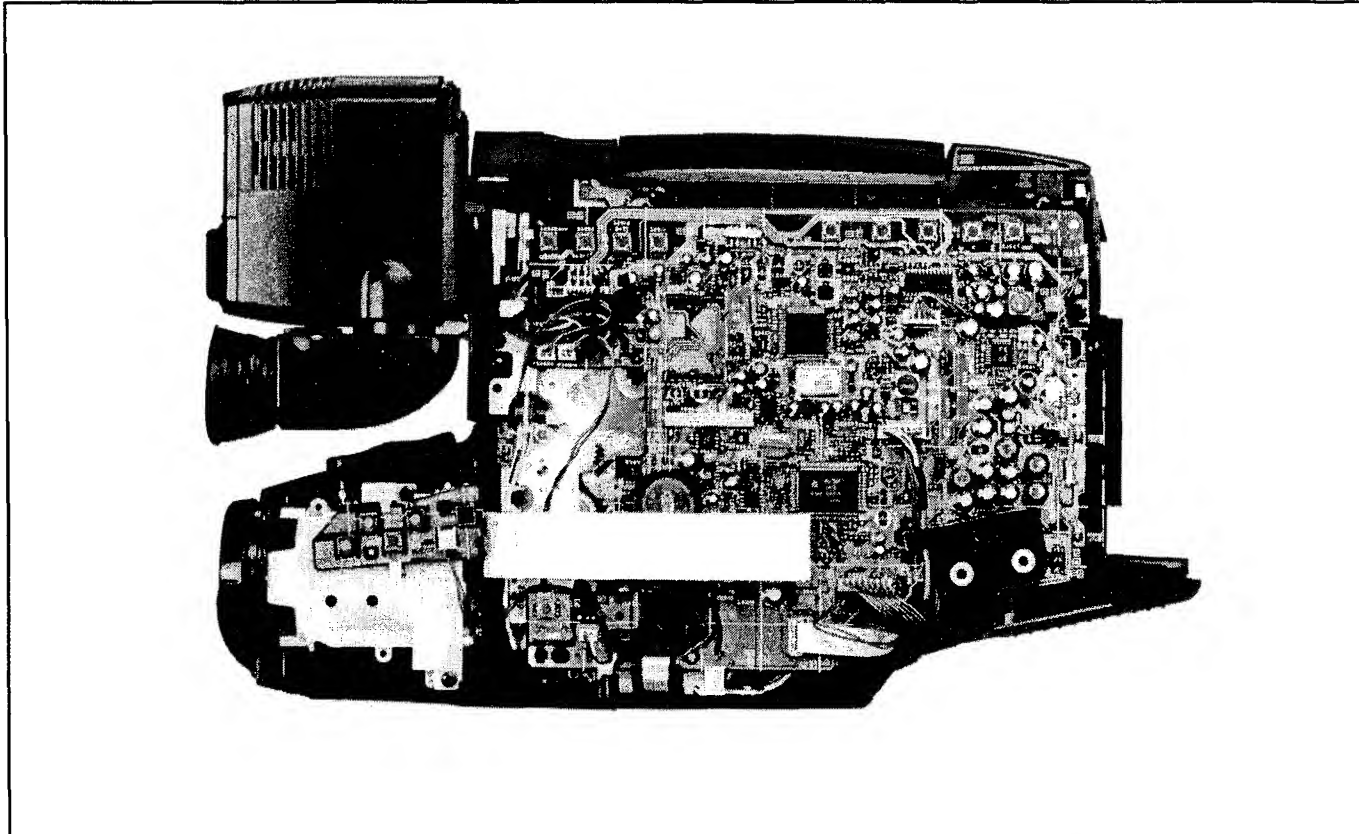
ITEM		VM-2980E(AU)/(AV)	VM-7380E(AU)/(AV)
CAMERA (AUTOFOCUS)	CCD Sensor	MN37210FE (IC1001)	MN37112FP (IC1001)
	CDS/AGC	HA118184F (IC1101)	
	A/D CONV.	HTS9620A (IC1102)	HD49319A (IC1102)
	DSP		HG51CS035TEA (IC1103)
	Drive Pulse Generator	μPD16510GR (IC1104)	
	D (Digital) -μP	HD6433042T15F (IC1106)	HD6433042ST31F (IC1106)
	EEPROM	MX25S67MR (IC1107)	
	F Det./Iris Drive	UPC5023GS-105 (IC1201)	
	Zoom Motor Driver	MPC17AT85VM (IC1301)	μPD16833G3 (IC1301)
	Focus Motor Driver	MPC17AT85VM (IC1302)	
EVF	Video Amp/Vertical & Horizontal Deflection	HA118121T (IC2001)	
SYSTEM CONTROL (POWER) & SERVO	Main μP	HD6433974SA71F (IC901)	HD6433974SB53F (IC901)
	Reg./Volt. Det	S84206F (IC902)	
	Level Shift	HD74HCT125T (IC903)	SN74AHCT125PW (IC903)
	Loading Motor Drive	BA6417F (IC904)	
	Sync Separator	BA7046F (IC905)	
	Cylinder Motor Drive	XLA6458FPY (IC602)	M56747FP (on the cylinder motor)
	Capstan Motor Drive	LB1851 (IC1M on the capstan motor)	
	Switching Regulator	XRA9706K (IC501)	
LUMA/CHROMA & AUDIO	Video/Linear Audio Processor	HA118203NF or NAF (IC201)	HA118203F (IC201)
	Video Head Amp	STV5727 (IC202)	
	Video Amp	μPC5023GS (IC203)	
	CCD Delay	MSM7470-71MS (IC204)	

## 4. JIGS AND TAPES FOR ADJUSTMENT

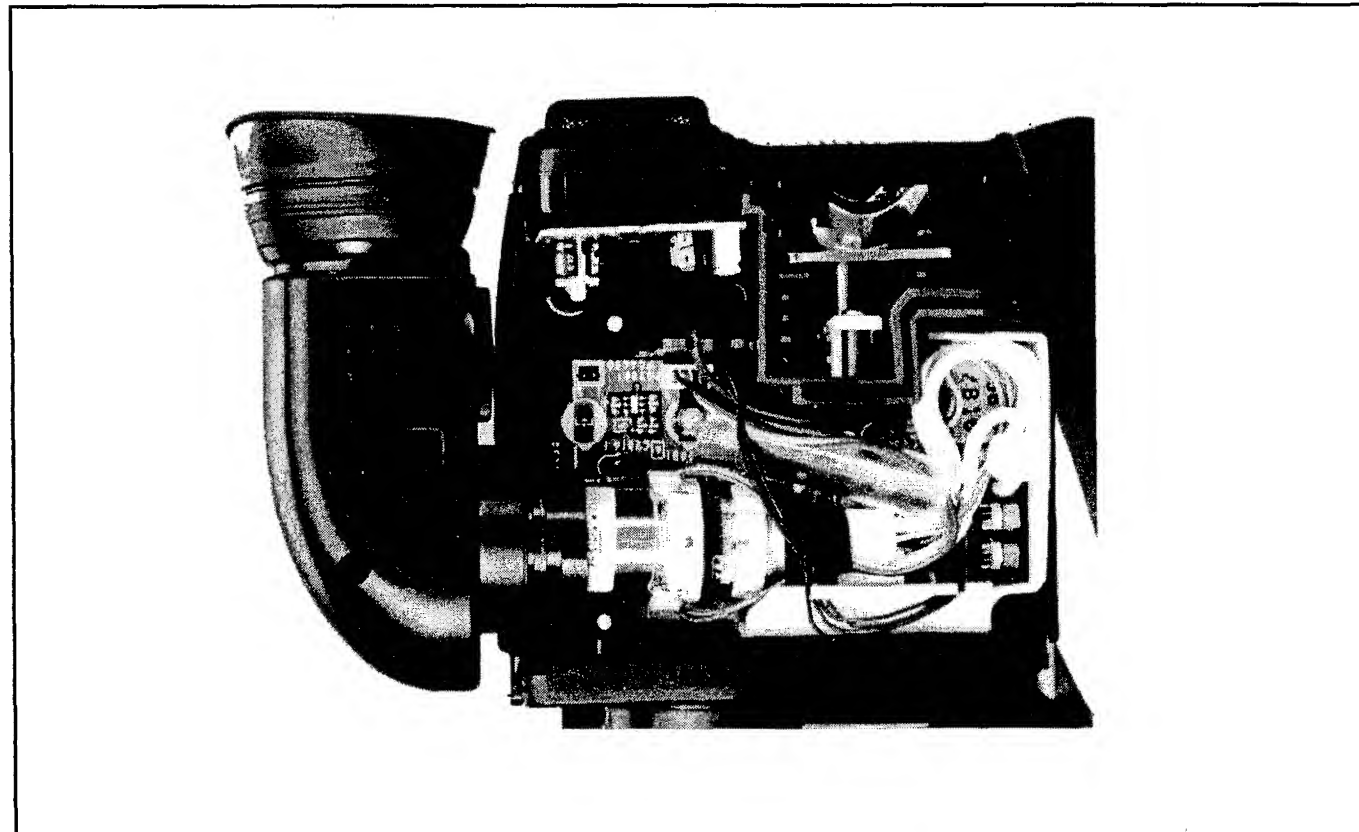
<p><b>1. BACK TENSION METER</b> No. 7099004</p> 	<p><b>2. ALIGNMENT TAPE</b> MH-2: No. 7099052</p> 		<p><b>3. MASTER PLANE</b> No. 7099279</p> 
<p><b>4. TORQUE GAUGE</b> No. 7099039</p> 	<p><b>5. TORQUE GAUGE ADAPTER</b> No. 7099204</p> 	<p><b>6. REEL DISK HEIGHT JIG</b> No. 7099038</p> 	<p><b>7. HEXAGONAL WRENCH</b> No. 7099202</p> 
<p><b>8. EXTENSION POWER CABLE</b> No. 7099326</p> 	<p><b>9. LIGHT BALANCING FILTER C12 (46mm Φ)</b> No. 7099369</p> 	<p><b>10. DSP-R JIG</b> No. 7099448</p> 	<p><b>11. 3-PIN EXTENTION CABLE</b> No. 7069066</p> 
<p><b>12. CAMERA ADJUST. FLOPPY DISK [New Jig]</b> No.7069196</p> 	<p><b>13. PERSONAL COMPUTER</b> [Goods on the Market]</p> 	<p><b>14. PERSONAL COMPUTER 9-PIN or 25-PIN CABLE</b> [Goods on the Market]</p> 	<p><b>15. RF CONVERTER UNIT (VM-RF80E) [Option]</b></p> 

5. DIAGRAMS TO BE REFERRED TO DURING DIASSEMBLY,  
REINSTALLATION AND ADJUSTMENT

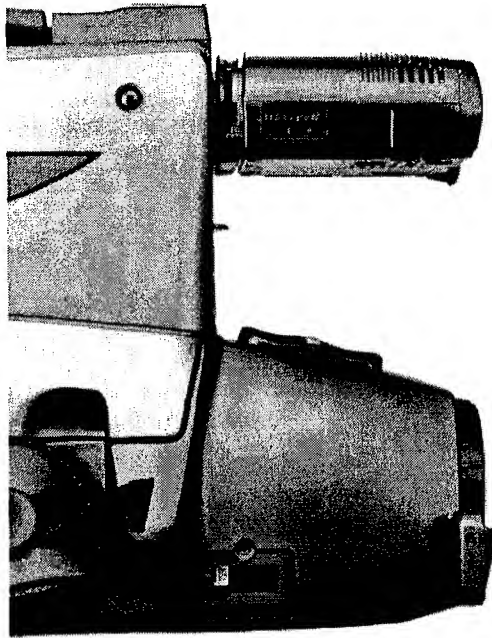
5.1 WIRING LAYOUT ON SPC AND MA CIRCUIT BOARD



5.2 WIRING LAYOUT ON EVF CIRCUIT BOARD



### 5.3 3-PIN EXTENSION CABLE CONNECT ON POINT



## 6. SERVICE MANUAL ABBREVIATION LIST

A	
ACC	Automatic Color Control
ADD	Adder
ADRS	Address
AF	Automatic focus (Autofocus)
AFC	Automatic Frequency Control
AGC	Automatic Gain Control
AGC KILLER	AGC Killer Voltage
AI	Automatic Intelligence
AIC	Automatic Iris Control
ALC	Automatic Level Control
AMP	Amplifier
APC	Automatic Phase Control
ASBL	Assemble (Phase Matching)
AUD.	Audio
AUX	Auxiliary
A/D	Analog-to-Digital Converter
A.DUB	Audio Dubbing
B	
B (BLU)	Color Signal Blue
BATT.	Battery
BF	Burst Flag
BG	Burst Gate or Back Ground
BGP	Burst Gate Pulse
BLK	Blanking
BPF	Bandpass Filter
BUF.	Buffer Amplifier
B-YL	Color Difference Signal B-YL
C	
C (CHROMA)	Chrominance Signal
CAM	Camera
CAPST.	Capstan
CARRI.	Carrier
CATV	Cable TV
C.BLK	Composite Blanking
CCD	Charge Coupled Device
CDS	Correlated Double Sampling
CG	Character Generator
C.FG (CFG)	Capstan Frequency Generator
C.FREE RUN	Capstan Free Run
CH (Ch or ch)	Channel
CHARA.	Character
CHD	Camera Horizontal Drive Pulse
C.MEMORY	Counter Memory
CNR	Chroma Noise Reducer
COM.	Common
COMPA.	Comparator
COMPE.	Compensator
COMP-EXP	Compressor-Expander
COMPO	Composite
CONT.	Control
CONV.	Converter
COUNT.	Counter
CP	CP
C.PAUSE	Camp Pulse
C/R	Capacitor/Resistor
C.RESET	Counter Reset or Camera Reset

C	
C.REVERSE	Count Reverse
CS	Communication Signal
CST	Cassette
C.SYNC	Composite Synchronizing Signal
CTL	Control Track Pulse (Control)
CYL	Cylinder
D	
D (Digital)	Digital
DA	Double Azimuth
D/A	Digital to Analog Converter
D-D	Direct Drive
DEEMPHA.	Deepphasis
DEF	Deflection
DEMODO.	Demodulator
DET	Detector
DIFF. AMP	Differential Amplifier
DISP.	Display
DL	Delay Line
DO	Dropout
DOC	Dropout Compensator
DSP	Digital Signal Processor
D/W	Dark/White
D.ZOOM (DZ)	Digital Zoom
E	
EAROM (EA-ROM)	Electrically Alterable Read Only Memory
EEPROM (EEP-ROM)	Electrical Erasable Programmed
E-E	Electronic-to-Electronic
EIS (E.I.S.)	Electronic Image Stabilizer
EMPHA. (EMPH)	Emphasis
EQ	Equalizer
ESS	Supply End Sensor
EST	Take-up End Sensor
EVF	Electronic Viewfinder
EXT.	External
E.ZOOM	Electronic Zoom
F	
F.ADV	Frame Advance
F/V	Frequency-to-Voltage Converter
FB	Feed back
FE	Full Erase
FF (F/F)	Flip Flop
F.FWD	Fast Forward
FG	Frequency Generator
FM	Frequency Modulation
FREQ.	Frequency
fsc	Sub Carrier Frequency
FWD	Forward
G	
GEN.	Generator
GND	Ground
H	
H (HORIZ.)	Horizontal
HB	Hi-Band

<b>H</b>	
HBF	Horizontal Burst Flag
HD	Horizontal Drive
Hi-Fi	High Fidelity
HPF	High-pass Filter
<b>I</b>	
IF	Intermediate Frequency
INDI.	Indicator
INST.	Instant
INT.	Internal
INV.	Inverter
I/O	In/Out (Input/Output)
IR	Infrared Rays
<b>L</b>	
LB	Low-Band
LCD	Liquid Crystal Display
LIN.	Linear
LM	Loading Motor
LNC	Line Noise Canceller
LOG	Logarithm
LP	Long Play
LPF	Low-pass Filter
LUMA	Luminance
L/R	Left/Right
<b>M</b>	
MAN	Manual
M.BRAKE	Main Brake
M.CUT	Monitor Cut
MEM.	Memory
MIC	Microphone
MIX	Mixer
MMV	Monostable Multivibrator
MOD.	Modulator
M.STATE	Mechanism State
M.STOP	Memory Stop
<b>N</b>	
NEG	Negative
NFB	Negative Feed Back
NOR. (NORM)	Normal
NR	Noise Reduction
<b>O</b>	
OB	Optical Black
OSC	Oscillator
OSD	On-Screen Display
<b>P</b>	
PB (PLAY)	Playback
PG	Pulse Generator
PLL	Phase Locked Loop
POS.	Positive
PROG.	Program
PROT.	Protector
PWM	Pulse Width Modulation
<b>R</b>	
R (RED)	Color Signal Red
RAM	Random Access Memory
REC	Record
RECT.	Rectifier

<b>R</b>	
REF.	Reference
REG.	Regulator
REV	Review
REW	Rewind
RF	Radio Frequency
ROM	Read Only Memory
RSS	Supply Reel Sensor
RST	Take-up Reel Sensor
R-YL	Color Difference Signal R-YL
<b>S</b>	
SAW	Sawtooth Signal
SC1 (0°)	3.58MHz Subcarrier Signal 1 (0-degree Phase Shifted)
SC2 (90°)	3.58MHz Subcarrier Signal 2 (90-degree Phase Shifted)
SEPA. (SEP)	Separator
S/H	Sample and Hold
SP	Standard Play or Speaker
S.REEL	Supply Reel Sensor
SRCH	Search
SRV	Servo
STABI.	Stabilizer
S.TRACK	Slow Tracking
STBY	Standby Mode
S-VHS	Super VHS
SW	Switch
SW30Hz	30Hz Head Switching Pulse
(15 or 25Hz)	(15 or 25Hz Head Switching Pulse)
SYNC	Synchronizing signal
SYS.CON	System Control
<b>T</b>	
T (TELE)	Telephoto Angle
T.BRAKE	Take-up Brake
TP	Test Point
T.REEL	Take-up Reel Sensor
TRS	Transfer
<b>V</b>	
V (VERT.)	Vertical
V.AGC	AGC Voltage
VCO	Voltage Controlled Oscillator
VD	Vertical Drive
V.DUB	Video Dubbing
VHS	Video Home System
VOL.	Volume
VP	Voltage Pulse
VCXO	Voltage Controlled Crystal Oscillator
<b>W</b>	
W (WIDE)	Wide Angle
WHT	Color Signal White
WHD	Wide Horizontal Drive
WHT BAL.	White Balance
<b>Y</b>	
Y	Luminance Signal
Y/C	Luminance/Chrominance
YEL (Ye)	Color Signal Yellow
YL	Luminance Signal (Low Component)

## 7. LEADLESS (CHIP) COMPONENT IDENTIFICATION

### 7.1 Leadless Transistor

The part name of a leadless transistor is indicated by a code on its surface, using one letter, one letter and one numeral, two letters, two letters and one numeral, two numerals, two numerals and one letter, three letters, or four letters.

Note: There are transistors with the same code but different part names, or with the same part name but different codes. Refer to the parts lists to finally identify a transistor.

CODE	PART NAME	CODE	PART NAME
Leadless (Chip) Transistor			
3925	2SC3925	BQ	2SB709A
1CQ	2SCB902	BR	2SC4081R
1D	2SC3127	BR	2SC2412K
1DS	2SD1328S	BR	2SC4617
1DT	2SD1328	BS	2SC2412K
1R	2SB970TX	C-7	2SA811
2BQ	2SK374PQ	C1G	KSC1623
2BR	2SK374QR	CB	2SC3646
2Y	2SC3757	CC	2SA1122C
2YQ	2SC4691	CC	2SC3647T
3N	2SK620	CC	2SC3647
4N	XN5601	CD	2SA1122D
4Q	XN1B301	CE	2SA1122E
4R	XN1C301	CK	2SD999
5C	XN4601	CP	2SC4097
5C	XP4601	CQ	2SC2411K
5H	XP4501	CR	2SB710
5H	XN4501	CR	2SC2411
5K	XP4401	CR	2SB1219
5K	XN4401	D16	2SC1622A
5L	XN5501	D17	2SC1622A
5N	XN6501	D18	2SC1622A
5O	XN6401	DB	2SD1766
5R	XP1501	DE	2SC2463
5R	XN1501	DF	2SD1623
5S	XN1504	DF	2SD1898
5V	XN1401	DG	2SD1624
5W	XN2501	DK	2SB798
5X	XN4504	EC	2SA1022
7R	XN2401	F-2	2SC1009F2
7S	XN1601	F-3	2SC1009F3
AA	2SD1757K	F-4	2SC1009F4
AKQ	2SA1738	FC	2SC2619
AKQ	2SA1806	FR	2SA1774
AL	2SA1791	FR	2SA1037K
AM	2SC4656	FR	2SA1576R
AO	2SB709AQR	FS	2SA1037K
AQ	2SB709AQ	GC	2SC2734
AQ	2SB766	GM	3SD1615
AR	2SB1462	HQ	2SA1036K
AR	2SB766	IC	2SC3016
AR	2SB709ARS	IRD	2SA1484
AR	2SB1218R	IS	2SB792S
AS	2SB766	IT	2SB792T
AS	2SB709AS	L-4	2SC1623L4
B3	2SC1621B3	L-5	2SC1623L5
B4	2SC1621B4	L-6	2SC1623L6
BC	2SB1188	L-6	2SC2812L6
BD	2SB1121	L-7	2SC2812L7
BE	2SB1260	L5	MMBC1623L5
BF	2SB1123	L6	MMBC1623L6
BF	2SB1308	LB	2SC2462B
BG	2SB1124	LC	2SC2462C
BH	2SB1001	LD	2SC2462D

CODE	PART NAME	CODE	PART NAME
Leadless (Chip) Transistor			
LR	2SC2412KLN	T2	IMT2
M-5	2SA812	UD	2SC2404
M-6	2SA1179	ZS	2SD874S
MC	2SA1052MC	VR	2DS968A
MD	2SA1052MC-D	W1	FMW1
N3	2SC1653	W10	FMW10
ND	2SD1306ND	W2	FMW2
NE	2SD1306NE	W3	FMW3
PD	2SA1171D	WR	2SD602
PS	2SD814	X1	UMX1
QB	2SC2520QB	X1	IMX1
QC	2SC2620QC	X2	IMX2
QO	2SC2714	Y1	FMY1
R22	2SC4226	Y12	2SA1464
R22	2SC3356	Y25	NTM3906
R32	2SC4227	Y3	FMY3
R34	2SC3583	YCD	2SK197
R42	2SC3585	YI	2SA1666
RB	2SC2618RB	YQ	2SD601YQ
RC	2SC2618RC	YR	2SD601YR
RK	2SC3357	YR	2SD1819R
S1	FMS1	YR	2SD2216
S2	FMS2	YS	2SD601YS
SC	2SA1121	Z1	IMZ1
SO	2SA1162	Z2	IMZ2
SP	2SC3082K	ZO	2SD874T
T1	IMT1	ZQ	2SD601A
T1	UMT1	ZR	2SD874R
Digital Transistor			
3	DTC143TK	6C	UN9113
4	DTC114TK	6S	NP4113
6	DTC144TK	8B	UN5212
13	DTA143EK	8C	UN9213
14	DTA144EK	8C	UN2213
15	DTA124K	8S	XP4213
15	DTA124EU	9L	XP1213
16	DTA144EU	9L	XN1213
16	XDA144EK	A1	FMA1
16	DTA144EE	A1	UMA1
23	DTC143EK	A2	FMA2
24	DTC114EU	B2	UMB2
24	DTC144EK	B2	IMB2
25	DTC124EU	C2	FMC2
25	DTC124K	C5	FMC5
26	DTC144EE	D2	IMD2
26	DTC144EU	F52	DTB123
26	XDC144EK	G1	FMG1
33	DTA143XK	G2	FMG2
43	DTC143XK	G21	DTD113ZK
52	DTA123YK	G5	FMG5
60	UN511F	H03	DTC343TK
64	DTC114YK	H2	IMH2
80	UN521F	H2	UNH2
4P	XN1A312T	H27	DTC363EK
6B	UN5112	RO4	KSR1104
6C	UN2113	R31	FP1L2Q
FET			
30	2SK621	KB	2SK323
1FQ	2SK321FQ	WS	2SK322T
1FR	2SK321FQR	WT	2SK322T
1KP	2SK316	X15	2SK425
2BQ	2SK663	X4	2SK94
DY	2SK1579	XAF	2SK980FG
JO	2SK208	YC	2SK197YC
K	3SK166	YD	2SK197YD
K4	2SK160K4	YE	2SK197YE
K5	2SK160K5	ZD	2SK217ZD

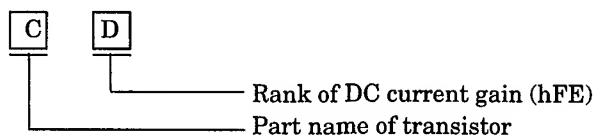


(1) Identification with two letters

Use this code and the following chart for transistor identification.

Example :

Code	Part name
CD	2SA1122D
LD	2SC2462D

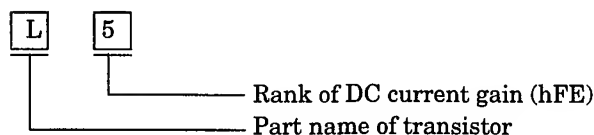


(2) Identification with one letter and one numeral

Use this code and the following chart for transistor identification.

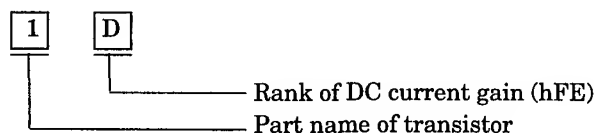
Example :

Code	Part name
L5	2SC1623(5)
L6	2SC1623(6)



Example :

Code	Part name
1D	2SC3127D



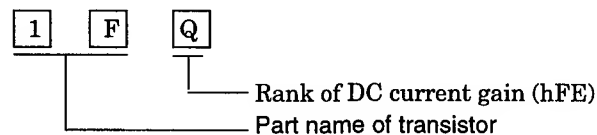
Note: Codes S1,S2,T1,W1,W2,W3,X1,Y1,Y3,Z1 and Z2 encode only the part names.

(3) Identification with one numeral and two letters

Use this code and the following chart for transistor identification.

Example :

Code	Part name
1FQ	2SK321Q

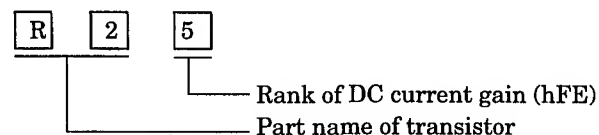


(4) Identification with one letter and two numerals

Use this code and the following chart for transistor identification.

Example :

Code	Part name
R25	2SC3356

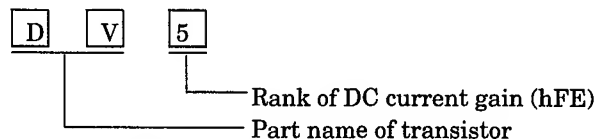


(5) Identification with two letters and one numeral

Use this code and the following chart for transistor identification.

Example :

Code	Part name
DV5	2SD596

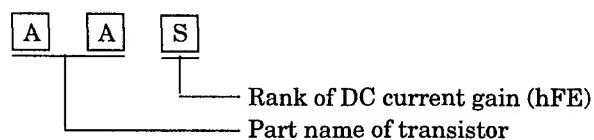


(6) Identification with three letters

Use this code and the following chart for transistor identification.

Example :

Code	Part name
AAS	2SD1757KS



7.2 Leadless Diode

The part name of a leadless diode is indicated by a code on the surface, using one letter and one numeral, two letters, two letters and one numeral, two numerals and one letter, or three numerals. Use this code and the following table to identify the part name of a diode.

Note: Refer to the parts lists to finally identify a diode.

CODE	PART NAME	CODE	PART NAME
Diode			
0	HVU300A	3D	RB715F
1.0	ISV201	3.0L	MA3030L
2.0	MA3020	3.6L	MA3036L
5.1	MA3051L	3.9L	MA3039L
5.1	MA3051M	4.3H	MA3043H
6.8	MA3068	4.3L	MA3043L
6.8	MA3068M	4.3M	MA3043M
7.5	MA3075L	4.7L	MA3047L
8.2	MA3082M	4.7M	MA3047M
9.1	MA3091	5.1H	MA3051H
20	HZM6	5.1L	MA3051L
24	ISV221	5.1M	MA3051M
27	RD2.7M B	5.6M	MA3056M
30	RD3.0M B	6.2L	MA3062L
51	RD5.1M B2	6.2M	MA3062M
56	RD5.6M B	6.8H	MA3068H
91	RD9.1M B	6.8L	MA3068L
102	RD10M B2	6.8M	MA3068M
122	RD12M B2	6.8M	MA3068
163	RD16M B3	7.5H	MA3075H
182	RD10M B2	7.5L	MA3075L
271	RD2.7M B	8A	UN221D
272	D2.7M B2	8.2H	MA3082H
301	RD3.0M B	8.2M	MA3082M
362	D3.6M B2	9.1M	MA3091M
391	D3.9M B1	9.1M	MA3091
512	RD5.1M B2	10L	MA3100L
561	RD5.6M B	10M	MA3100M
621	RD6.2M B1	11L	MA3110L
681	RD6.8M	12M	MA3120M
683	RD6.8M B3	13H	MA3130H
911	RD9.1M B	18M	MA3180M
2.7H	MA3027H	36M	MA3360

CODE	PART NAME	CODE	PART NAME
Zener Diode			
1A	MA110	M3A	MA199
A3	1S2835	MC	MA153
A4	HSM2836C	MC	MA143
A5	1S2837	MH	MA141K
A6	HSM2838C	MH	MA151K
B	SB0505CP	MH	MA152K
B64	SFPB64	MI	MA132K
B74	SFPB74	MN	MA141WA
BE	1SV172	MN	MA152WK
C1	HSM88S	MN	MA132WA
C2	HSM276S	MO	MA152WA
C3	1SS226	MO	MA133
C4	HSM88WK	MP	MA151WK
F7	KV1470	MT	MA141WK
H5	HVM14	MT	MA141WK
J	SB07-03C	MU	MA132WK
K	DA221	MU	MA151WA
M1A	MA159	N	DAN222
M1C	MA158	N	DAN202T
M1M	MA721	NU	MA152WK
M1N	MA713DAT	P	DAP202T
M1P	MA714	S4	DIFS4
M2A	MA122	SA	SB10-05P
M2B	MA123	Z	DA106K

### 7.3 Leadless Resistor

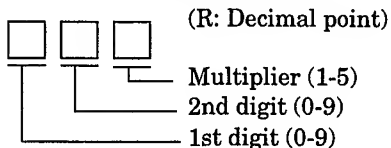
The resistor value is indicated on its surface, using three numerals, or one letter and one numeral.

#### (1) Identification with three numerals

Read this code following the same procedure as when reading the color code on discrete resistors.

Example:

Code	Value
330	33 ohms
561	$56 \times 10 = 560$ ohms
123	$12 \times (10 \times 10 \times 10) = 12K$ ohms
1R2	$1 + 0.2 = 1.2$ ohms



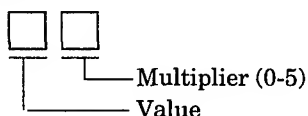
#### (2) Identification with one letter and one numeral

Use this code and the following chart for resistor identification.

Letter	Value	Letter	Value	Letter	Value
A	1	J	2.2	S	4.7
C	1.2	L	2.7	U	5.6
E	1.5	N	3.3	W	6.8
G	1.8	Q	3.9	Y	8.2

Example:

Code	Value
A1	$1 \times 10 = 10$ ohms
G2	$1.8 \times (10 \times 10) = 180$ ohms
L3	$2.7 \times (10 \times 10 \times 10) = 2700$ ohms
S4	$4.7 \times (10 \times 10 \times 10 \times 10) = 47K$ ohms
W5	$6.8 \times (10 \times 10 \times 10 \times 10 \times 10) = 680K$ ohms



### 7.4 Leadless Capacitors

The capacitor value is indicated on its surface, using body color and one letter, or one letter and one numeral.

#### (1) Identification with body color and one letter

Body Color	Letter	Value	Body Color	Letter	Value
Red	A	1(PF)	Blue	G	180(PF)
	C	2		J	220
	E	3		L	270
	G	4		N	330
	J	5		Q	390
	L	6		S	470
	N	7		U	560
	Q	8		W	680
	S	9		Y	820
Black	A	10(PF)	White	A	0.001(μF)
	C	12		E	0.0015
	E	15		J	0.0022
	G	18		L	0.0027
	J	22		N	0.0033
	L	27		S	0.0047
	N	33	Green	W	0.0068
	Q	39		A	0.01(μF)
	S	47		E	0.015
	U	56		J	0.022
	W	68		N	0.033
	Y	82		S	0.047
Blue	A	100(PF)	Yellow	U	0.056
	C	120		W	0.068
	E	150		Y	0.082
				A	0.1(μF)

Example :	Color	Letter	Value
	Red	A	1PF
	Black	A	10PF

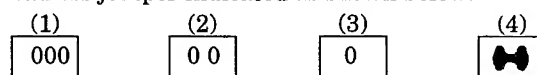
#### (2) Identification with one letter and one numeral

Letter/Numeral	Value	Letter/Numeral	Value
A0	1(PF)	A2	100(PF)
H0	2	C2	120
M0	3	E2	150
d0	4	G2	180
f0	5	J2	220
m0	6	L2	270
n0	7	N2	330
t0	8	Q2	390
y0	9	S2	470
A1	10(PF)	U2	560
C1	12	W2	680
E1	15	Y2	820
G1	18	A3	0.001(μF)
J1	22	E3	0.0015
L1	27	J3	0.0022
N1	33	N3	0.0033
Q1	39	S3	0.0047
S1	47	W3	0.0068
U1	56	A4	0.01(μF)
W1	68	E4	0.015
Y1	82	J4	0.022
		N4	0.033
		S4	0.047
		U4	0.056
		W4	0.068
		A5	0.1

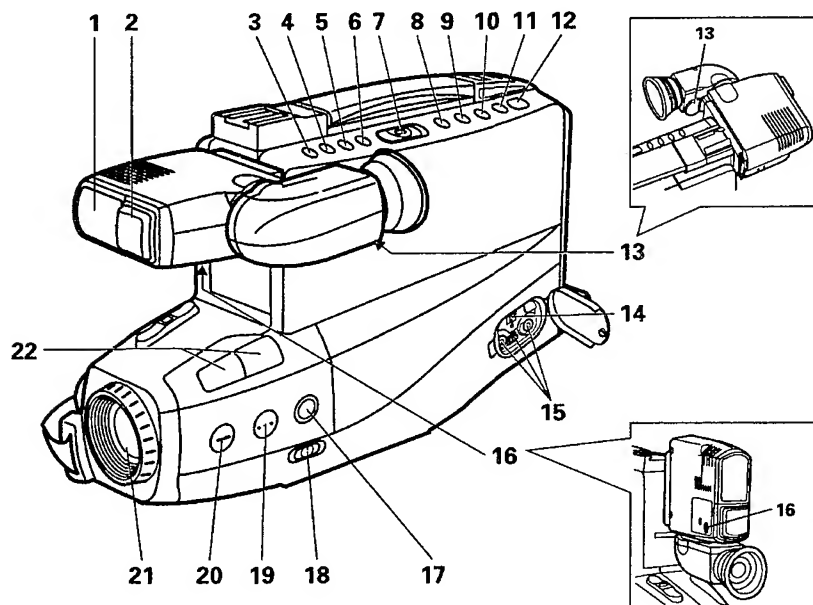
Example :	Letter/Numeral	Value
	A0	1PF
	A1	10PF

### 7.5 Leadless Jumper

The leadless jumper indicated as shown below.



## CONTROLS AND FUNCTIONS

**1. Camera Light**

The camera light is turned on or off depending on the position of the LIGHT switch.

**NOTE:** The camera light turns on only in the record and record pause modes.

**2. Microphone**

Sensitive to sounds coming from the direction in which the camera is pointed.

**3. DISPLAY Button**

If this button is pressed, the tape counter, remaining battery power level, etc. appear in the viewfinder and the tape's 0000M position is stored in memory. If the camera/recorder is connected to a TV/monitor receiver, the same display as that in the viewfinder appears on the screen. (See "DISPLAY BUTTON" and "MEMORY" on page 17.)

**4. RESET Button**

Pressing this button resets the counter to "0000"

**5. DATE/TIME Button**

Press this button to display the date and time in the viewfinder. Whenever the date and time appear in the viewfinder, they will be recorded on the tape.

**6. TITLE Button**

Press this button to create and record personalized titles on your videos with the camera/recorder's built-in titler. See page 25.

**7. CAM/OFF/VIDEO Switch**

This switch changes the camera/recorder to the record mode or to the playback mode.

Press and hold the small button on this switch, then slide it to "CAM" or "VIDEO"

**8. DUBBING AUDIO/VIDEO Mode Select Button**

This button is used to record new audio in place of existing audio without erasing the video signal or to record new video and audio while erasing the previous audio and video signals.

**9. REW/REVIEW Button**

Press this button during stop or fast forward mode, and fast-rewinding starts. Press the button during playback of tape, and the tape is played back in the rewind direction approximately 3 times faster than the normal speed to confirm the recorded contents. Press the PLAY button to return to normal playback mode or press the STOP/EJECT button to stop tape movement. Also use this button to review the last few seconds of the tape you are recording. See page 13.

**NOTE:** You can also visually scan backward when the camera/recorder is in record/pause (stand-by) mode by pressing and holding this button.

**10. PLAY Button**

Used for playback of tape recorded in the SP mode.

**NOTE:** When the camera/recorder is in record/pause (stand-by) mode, pressing and holding this button will play the tape at normal.

**11. F.FWD Button**

Press this button during stop or rewind mode, and fast-forwarding starts. Press the button during playback of tape, and the tape is played back in the forward direction approximately 3 times faster than the normal speed to confirm the recorded content. Press the PLAY button to return to normal playback mode or press the STOP/EJECT button to stop tape movement.

**NOTE:** You can also visually scan forward when the camera/recorder is in record/pause (stand-by) mode by pressing and holding this button.

**12. STOP/EJECT Button**

The STOP/EJECT button is used to stop playback, rewind, and fast forward operations. The STOP/EJECT button has no effect during record operation. Press the button in the stop mode to insert or remove the cassette.

**13. Diopter Control (on the side of the viewfinder)**

To use the electronic viewfinder without eyeglasses on, turn this control for your optimum focus adjustment.

**14. "AV OUT/IN" Switch**

This switches the AUDIO and VIDEO jacks between the input and output.

When the switch is set to "OUT", the AUDIO and VIDEO jacks can be used as output jacks, and when the switch is set to "IN", they can be used as input jacks. When the AUDIO and VIDEO jacks are used as the input jacks, the input PAL and SECAM (System B & G) signals can be recorded.

**15. AUDIO/VIDEO/RF DC OUT Jacks (behind the cover)**

AUDIO and VIDEO jacks can be used as input or output jacks depending on the position of "AV OUT/IN" switch.

- When using these jacks as outputs, connect the supplied audio/video cables or the RF converter unit to view a playback picture on a TV.
- Use AUDIO and VIDEO jacks as inputs when you supply signals from another device to your camera/recorder for recording.

**16. MIC Jack (under the built-in microphone)**

Connect an external microphone (not supplied) here to record sound from the external microphone.

**NOTE:** Connecting an external microphone automatically switches off the built-in microphone.

**17. DIGITAL FADE Button**

During recording you can add a professional touch to your recordings by fading in and out of scenes. You can select four fade modes — white fade, wipe fade, zoom fade and black-and-white fade.

**18. Camera Light Switch**

This switch is used to turn the built-in camera light on and off. When the switch is in the "AUTO" position, the camera light turns on automatically if the lighting in the area around the subject is insufficient for a clear picture.

**19. DIGITAL EFFECT Button**

Use this button to add special effects to your recording. You can select five modes — 16X9 mode, negative/positive mode, X130 digital zoom mode, half-mirror mode and mosaic mode.

**20. INST. ZOOM (Instant Zoom) Button**

Use this button to magnify the image being recorded 1.5 times momentarily.

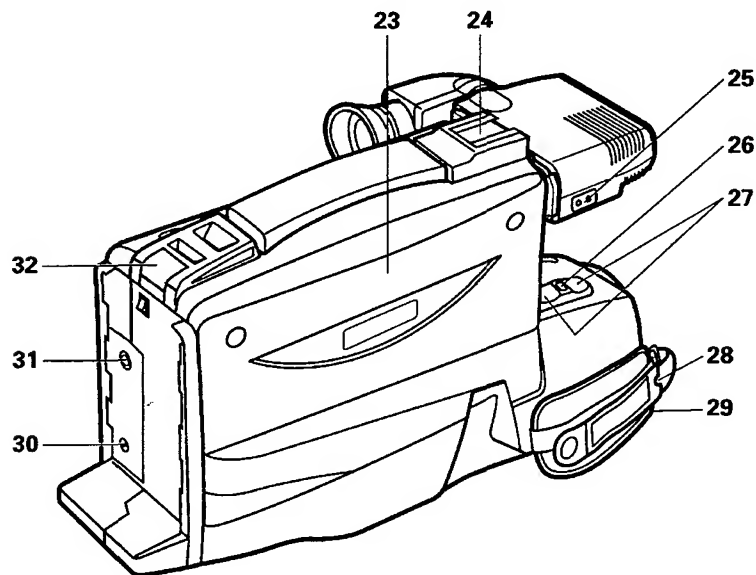
**21. Lens**

F1.4 (4-64 mm) 16:1 power zoom lens features with auto focus and auto iris functions.

**22. Focus Control Buttons (AUTO/MAN ◀ FOCUS ▶)**

Press these buttons simultaneously to select manual or automatic focus. "FOCUS" appears in the viewfinder when you select the manual focus mode by pressing both buttons simultaneously. For manual focusing, press the ◀ or ▶ button to bring the subject into focus.

## CONTROLS AND FUNCTIONS



### 23. Cassette Holder

Press the STOP/EJECT button in the stop mode to open the cassette holder. Be aware of the cassette direction when inserting.  
**NOTE:** Power source must be connected to open the cassette holder.

### 24. Accessory Shoe

Used to attach an optional video accessory.

### 25. BRIGHT and FOCUS Controls

Use to adjust the viewfinder brightness and focusing.

### 26. REC/PAUSE Button

When this button is pressed during recording, the tape stops and the camera/recorder enters the record/pause (stand-by) mode. When this button is pressed again, the tape runs to resume recording. This button may be also used to display a still picture during playback mode.

### 27. Power Zoom Switch/TRACKING Control

This switch performs zooming electrically.  
"W": Picture becomes wider gradually.  
"T": Picture becomes telescopic gradually.  
This switch is used as a tracking control during tape playback to adjust for the optimum picture.

### 28. Lens Cap Tab

Place the lens cap on this tab when you are ready to record a scene. The tab also prevents the lens cap from swinging around on its cord.

### 29. Hand Strap

Adjust to best fit to your hand.

### 30. DC IN 9.6V Jack

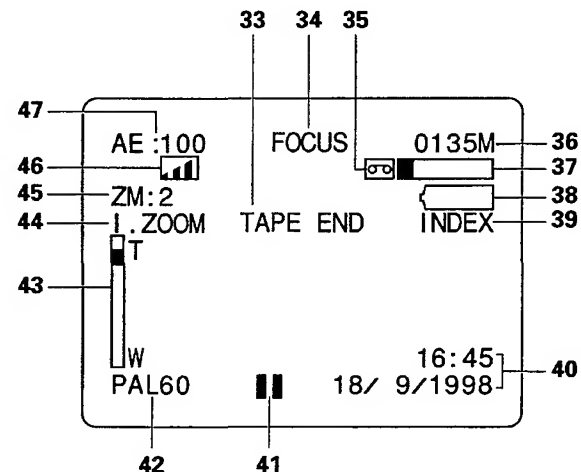
When using the AC adaptor/charger, connect one end of the DC cord (provided) to this jack and the other end to "DC OUTPUT" of the AC adaptor/charger. When using the car cord (optional), connect this jack and the car's cigarette lighter socket.

### 31. S.EDIT Jack

For synchro editing, connect the optional synchro edit cord here.

### 32. BATTERY EJECT Button

Release the battery attached to the video camera/recorder.



### 33. TAPE Indicator

When the REC/PAUSE button is pressed, if a cassette without its safety tab is inserted, "TAPE" appears for several seconds.  
When the REC/PAUSE button is pressed, if no cassette is inserted, "NO TAPE" appears for several seconds.  
When the tape reaches near the end during shooting, "TAPE END" flashes.

### 34. FOCUS Indicator

This indicator shows when the camera/recorder is set to the manual focusing mode. It lights when the AUTO/MAN FOCUS control buttons are pressed simultaneously.

### 35. Cassette-in Indicator

Lights when a cassette has been loaded in the camera/recorder.

### 36. Tape Counter

Shows tape counter in 4-digit number.

### 37. Time Remaining Indicator

Shows remaining tape in seven steps.

### 38. Battery Indicator

Indicates the battery condition.

### 39. INDEX Indicator

See page 20 for details.

### 40. Date/Time Indicator

Indicate the date/clock during the record or record/pause (stand-by) mode. You can record the clock and/or date with object when recording.

### 41. Mode Indicator

Indicates the operating modes;  
• "REC" appears during the record mode.  
• "◀" appears during the rewind mode.  
• "▶▶" appears during the fast forward mode.  
• "II" appears during the record/pause (stand-by) mode.

### 42. Video System Mode Indicator

Indicates the video system mode.  
During recording: Displays "PAL" when a PAL signal is recorded. No display appears when a SECAM signal is recorded.  
During Playback: Displays "PAL" when a tape recorded in the PAL system is played back or "PAL60" when an NTSC tape is played back. No display appears when a tape recorded in the MESECAM system is played back.

### 43. Zooming Range Indicator

Shows the rough zooming range for a few seconds when the zoom switch is pressed.

### 44. Zoom Indicator

- "ZOOM" appears when the digital zoom is engaged.
- "I.ZOOM" appears in the instant zoom mode.

### 45. Digital Effect Mode Indicator

Appears when the DIGITAL EFFECT button is pressed.  
• "16X9" appears when the 16X9 mode is engaged.  
• "NEGPOS" appears when the negative recording mode is selected.  
• "ZM:2" appears when the X130 digital zoom mode is selected.  
• "MIRROR" appears when the half-mirror recording mode is selected.  
• "MOSAIC" appears when the mosaic recording mode is selected.

### 46. Fade Mode Indicator

Shows the selected fade mode when fading in and out.

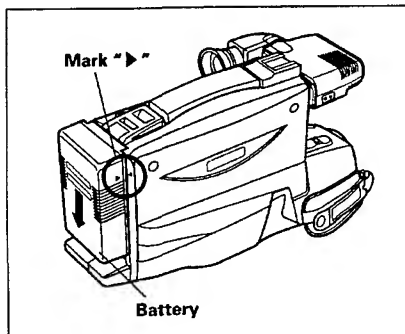
### 47. Shutter Speed Indicator

Indicates the selected shutter speed.

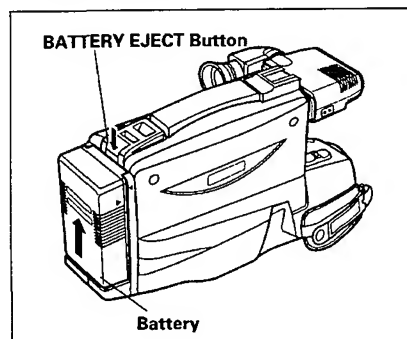
## POWER SOURCES

### ■ WHEN USING WITH THE BATTERY

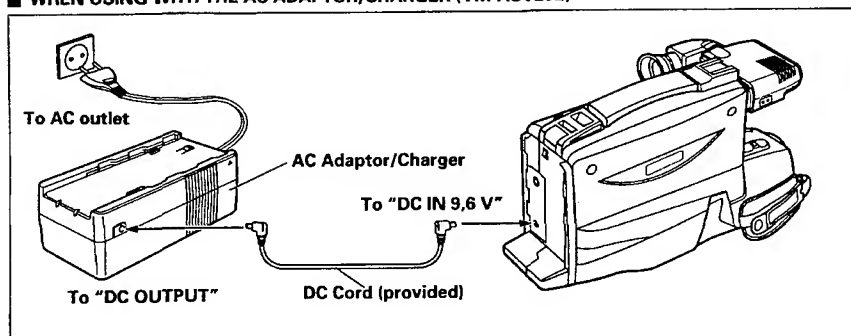
- To attach, align the mark "▶" on the battery with that of the camera/recorder so that the battery fits into the grooves, and slide the battery downward, as illustrated.



- To remove, slide the battery upward while pressing the BATTERY EJECT button in the direction of the arrow.



### ■ WHEN USING WITH THE AC ADAPTOR/CHARGER (VM-ACV23E)



- Connect one end of the DC cord (provided) to the "DC IN 9.6V" jack of the camera/recorder. Connect the other end of the DC cord to the "DC OUTPUT" of the AC adaptor/charger.
- Plug the AC adaptor/charger power cord into an AC electrical outlet.
- After the AC adaptor/charger has been used, unplug its power cord from the AC outlet.

See the bottom of the AC adaptor/charger. The rating label is located on the bottom of the AC adaptor/charger.

#### NOTES:

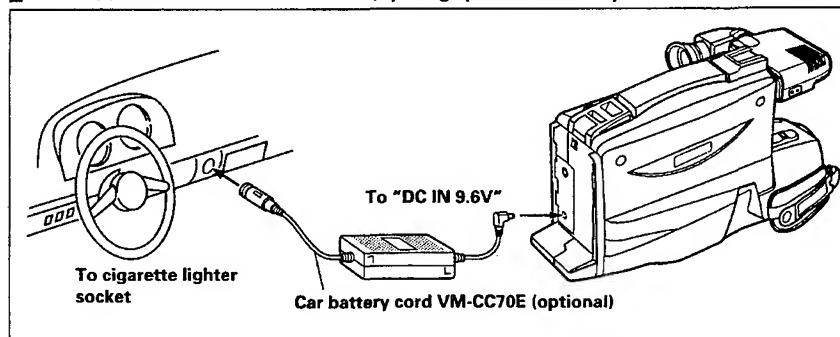
- The AC adaptor/charger cannot charge the battery and operate the camera/recorder at the same time.
- This AC adaptor/charger is universal for use with AC 110 — 240V around the world. If you use the camera/recorder in some foreign countries, an AC plug adaptor (provided) may be necessary.



AC Plug Adaptor (provided)

- When using the AC adaptor/charger to power the camera/recorder, the battery level indicator may display "■". This indicator is used for battery operation and has no meaning when using the AC adaptor/charger to power the camera/recorder.

### ■ WHEN USING WITH THE CAR BATTERY (By using optional car battery cord Hitachi VM-CC70E)



- Connect the small plug of the car battery cord to the "DC IN 9.6V" jack of the camera/recorder.
- Connect the other end of the car battery cord to the car's cigarette lighter socket.

#### NOTES:

- The car battery cord is designed to be used only with automobiles having a 12-volt negative ground system.
- To avoid possible damage to your camera/recorder, make sure the car cord you plan to use has positive tip polarity and is capable of converting 12 volts to 9.6 volts such as Hitachi model VM-CC70E.

**NOTE:** Be sure to turn off power of the camera/recorder when attaching or detaching a power supply (battery, AC adaptor/charger, etc.) to the camera/recorder.

## CHECKING THE BATTERY PACK

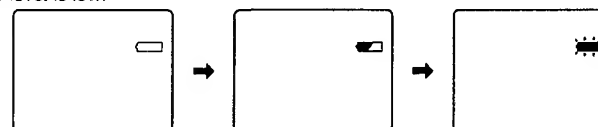
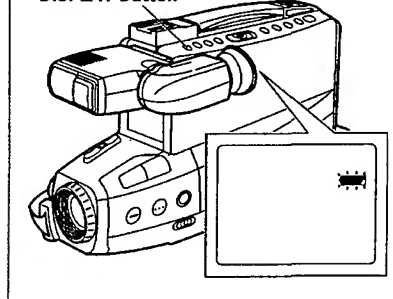
When the "■" indication in the electronic viewfinder appears and flashes while the video camera/recorder is operated with a battery pack, it indicates that the battery charge is insufficient. Charge it or replace it with a charged battery pack.

Press the DISPLAY button, and the battery level indicator "■" is displayed in the viewfinder indicating the condition of camera/recorder battery power. When the battery is fully charged, "■" is displayed.

After several minutes, the symbol will change to "■". When the battery is very near empty, the symbol will change to "■" and start blinking. You should find an alternative power source or recharge the battery before continuing to use your camera/recorder.

**NOTE:** When a battery pack is used to power the camera/recorder, "■" flashes even if the DISPLAY button is not pressed to warn you that the battery power level is low.

DISPLAY Button

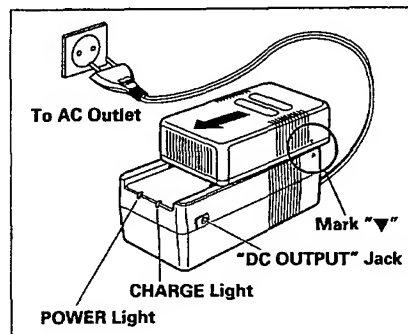


## CHARGING THE BATTERY PACK

1. Plug the AC adaptor/charger power cord into AC electrical outlet.
2. Attach the battery to the AC adaptor/charger. Align the mark "▼" on the battery with that of AC adaptor/charger and push the battery flush with the AC adaptor/charger and slide it in the direction of arrow.
3. The POWER indicator will light and charging will start.

**NOTE:** You must remove the DC cord from the AC adaptor/charger to charge the battery. If the DC cord is connected, the CHARGE light will not light.

4. The CHARGE light will be lit while the battery is accepting a charge, and will go out when the battery is fully charged.
5. After charging is finished, unplug its power cord from the AC outlet.



### NOTES:

- The time required for charging the battery is approx. two hours for VM-BP66 and three hours for VM-BP67.
- When fully charged, the battery should supply approx. 90 — 120 minutes of operating time for VM-BP67 (45 — 60 minutes for VM-BP66) (depending on how much you use zoom and pause).
- Charge the battery after use and store it at normal room temperature.
- Recharge your battery at least once every six months. The battery is a lead-acid battery. This battery tends to discharge if not used for an extended period of time. If the battery is stored for a extended length of time without being recharged, you may not be able to recharge it.
- A battery charged after being stored for a long period may not supply power for the specified time. Additional rechargings will help restore the battery's operation time.
- The battery should be charged at a temperature of 10°C — 30°C to prevent damage.
- Do not operate the battery at temperatures below -10°C or above 35°C. The battery may be damaged if operated at temperatures above 50°C. Operation time will decrease at extremely low temperatures.
- After repeated chargings and use, the operation time will gradually decrease. When operation time becomes too short to be useful, it is time to replace the battery.
- If the CHARGE and POWER lights on the AC adaptor/charger start flashing, remove the battery and then reattach it. If after several attempts both lights continue to flash, this means your battery cannot take a charge and must be replaced with a new one. The CHARGE light will not light if a hot battery is attached to the AC adaptor/charger. Attaching an extremely hot battery to the AC adaptor/charger is not recommended; it should be allowed to cool down before being attached.
- Do not short the battery's terminal.
- Do not attempt to disassemble or modify the battery. There are no user serviceable parts inside.
- Throwing the battery into a fire or exposing the battery to excessive heat — over 65°C could be hazardous.

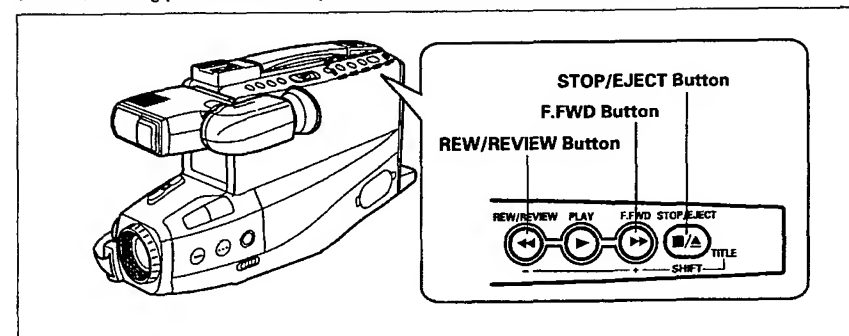
## DATE/TIME SETTING

The date and time can be recorded on your tapes to act as a handy reference when viewing them at a later time.

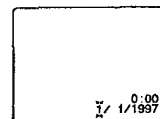
**NOTE:** A back-up battery for the date/time function is built into the camera/recorder. This battery is rechargeable and should be charged every two months. Charge the back-up battery by the following procedure.

1. Set the CAM/OFF/VIDEO switch to the "OFF" position.
2. Connect a power source (charged battery or AC adaptor/charger) to the camera/recorder and maintain this state for about 24 hours.

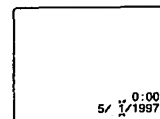
Use the following procedure to set up this display for the current date and time.



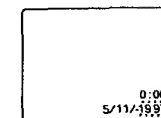
1. Press and hold the small button on the CAM/OFF/VIDEO switch, and then slide it to "CAM" position.
2. Press the DATE/TIME button. "0:00" and "1/1/1997" appears in the viewfinder and "1" flashes.



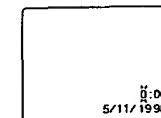
3. Press the F.FWD button to select correct date. Hold button down to advance rapidly. If you go past the date you want to set, press the REW/REVIEW button. When the correct date appears, press the STOP/EJECT button.



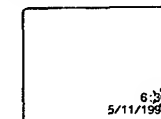
4. Press the F.FWD button to select correct month. Hold button down to advance rapidly. If you go past the month you want to set, press the REW/REVIEW button. When the correct month appears, press the STOP/EJECT button.



5. Press the F.FWD or REW/REVIEW button to select year, and then press STOP/EJECT button.



6. Press the F.FWD or REW/REVIEW button to select correct hour, and then press the STOP/EJECT button.
7. Press the F.FWD or REW/REVIEW button to select correct minute.



8. After setting correct minute, press the DATE/TIME button to start the internal clock.

**NOTE:** After the date and time are set, "⌚ AUTO" appears and the camera/recorder enters the automatic date recording mode. See "DATE RECORDING" on page 16.

### ■ To correct date/time after starting the date/time

1. Press and hold the DATE/TIME button, and then press the STOP/EJECT button. The date starts flashing.
2. Correct the incorrect digit by using the F.FWD, REW/REVIEW and STOP/EJECT buttons.

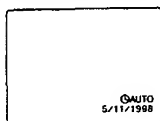
## DATE RECORDING

When the date has been set, the camera/recorder will enter the automatic date recording mode automatically. Specify the required date mode option before recording.

1. Press and hold the small button on the CAM/OFF/VIDEO switch, and then slide it to "CAM" position.
2. Press the DATE/TIME button repeatedly to select the date display you want to record.

### ⓐ AUTO and date — Automatic date recording

This option records the date automatically once a day at the beginning of recording for 10 seconds.

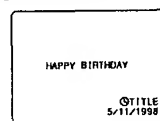


### NOTES:

- The camcorder records the same date when;
  - the cassette is replaced.
  - you select ⓐ AUTO and date display again.
  - the recording is less than 10 seconds long.
- If the date changes while recording continues over 10 seconds, the new date is recorded for about 10 seconds the next time you make a recording.

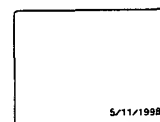
### ⓑ TITLE and date — Automatic title and date recording

This option records the date and created title (see "TITLE RECORDING" on page 25) automatically once a day at the beginning of recording for 10 seconds.



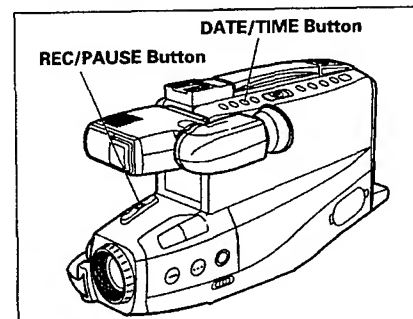
### Date only — Date recording

The camera/recorder records the date with the picture all the time.



### ■ To correct date/time during programming

1. Press the STOP/EJECT button repeatedly until the digit that is incorrect flashes.
2. Correct the incorrect digit by using the F.FWD, REW/REVIEW and STOP/EJECT buttons.



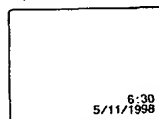
### No display — No date recording

The camera/recorder does not record the date.



### Date and time — Date and time recording

The camera/recorder records the date and time with the picture all the time.



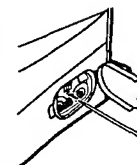
3. Press the REC/PAUSE button. Recording will start.

### NOTES:

- When ⓐ AUTO and date display is selected, the date disappears about 10 seconds after recording is started.
- When ⓑ TITLE and date display is selected, the title and date disappear about 10 seconds after recording is started.

## TROUBLESHOOTING

Symptom	Check Point & Correction
The cassette holder cannot be opened when you press the STOP/EJECT button in the stop mode.	Connect the power source.
Cassette cannot be inserted into cassette compartment.	Load cassette in direction indicated by arrow on cassette.
Picture does not appear in the viewfinder.	Remove the lens cap. Set the CAM/OFF/VIDEO switch to "CAM".
The camera/recorder can not go into the recording mode, even when the REC/PAUSE button is pressed.	The cassette has had the erase prevention tab removed. Stick a piece of cellophane tape over the erase prevention hole or select a different cassette. Set the CAM/OFF/VIDEO switch to "CAM". The " " indication in the electronic viewfinder flashes to indicate battery is discharged. Try another battery or charge the battery.
PLAY button cannot be engaged.	Set the CAM/OFF/VIDEO switch to "VIDEO"
Interference on playback picture.	Adjust the TRACKING control (power zoom switch T/W). When you see the playback picture on your TV, adjust fine tuning knob on television set to obtain the best picture.
Picture is out of focus. Auto-focus does not operate.	The prerecorded tape is LP recording. This camera/recorder is for use in SP recording only. Make sure that "FOCUS" does not appear in the viewfinder. If "FOCUS" is displayed, press the FOCUS (AUTO/MAN) control buttons simultaneously so that it goes out.
Power is turned on, but no button operations are accepted.	Remove the power source, and after about one minute, push the reset switch gently using a toothpick, etc. until you feel a click. The display will be reset. Then set the information again. <b>NOTE:</b> When connecting a power source again, wait for about one minute after the reset switch is pressed.

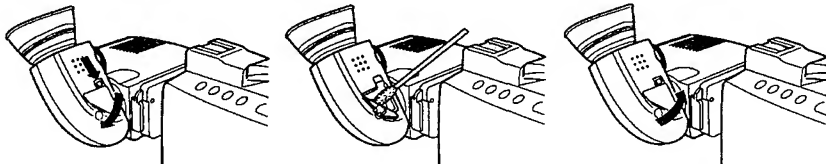


## MAINTENANCE

1. To maintain the optimum performance of this camera/recorder, regular periodic maintenance is required. Your dealer will advise you further.
2. Maintenance and adjustments may not be carried out by the user. In all cases of difficulty or doubt, consult your dealer.
3. Head cleaning
  - Under no circumstances we do recommend users to attempt to clean the video heads as this is done only effectively by removal of the cover to gain access to the video heads and other parts which require cleaning, which would expose live conductors and present a "shock" hazard.
  - In regard to the various head cleaning tapes which are currently available on the market, these can cause damage and also reduce the operational life of the video heads if used incorrectly. Please consult your dealer as to the suitability of any cleaning aids before purchase.
  - Dirt accumulated on the video heads after a period of time may cause the playback picture to become blurred or part of the video information to be lost. This does not mean that the recorded programme has been erased but head cleaning is required which must be carried out by your dealer.

### ■ CLEANING THE INSIDE OF THE ELECTRONIC VIEWFINDER

If dust or foreign matter adheres inside the viewfinder, clean it by using the following procedure.



1. Push the tab and hold it, then open the cover.

2. Clean the picture tube face and lens.  
To prevent scratching, use a soft non abrasive cloth, swab or lens cleaning paper.

3. Close the cover.



**Note:** Reinstall the components by the reverse procedure to removal when not otherwise specified.

## 1. CASES AND CIRCUIT BOARDS

### 1.1 LENS HOOD, CASSETTE LID, LEFT CASE, ELECTRONIC VIEWFINDER (EVF) BLOCK

#### ● LENS HOOD

- 1) Remove the lens cap.
- 2) Turn the lens hood in the direction of arrow (A).

#### ● CASSETTE LID

- 1) Remove 2 screws (1) holding the cassette lid.

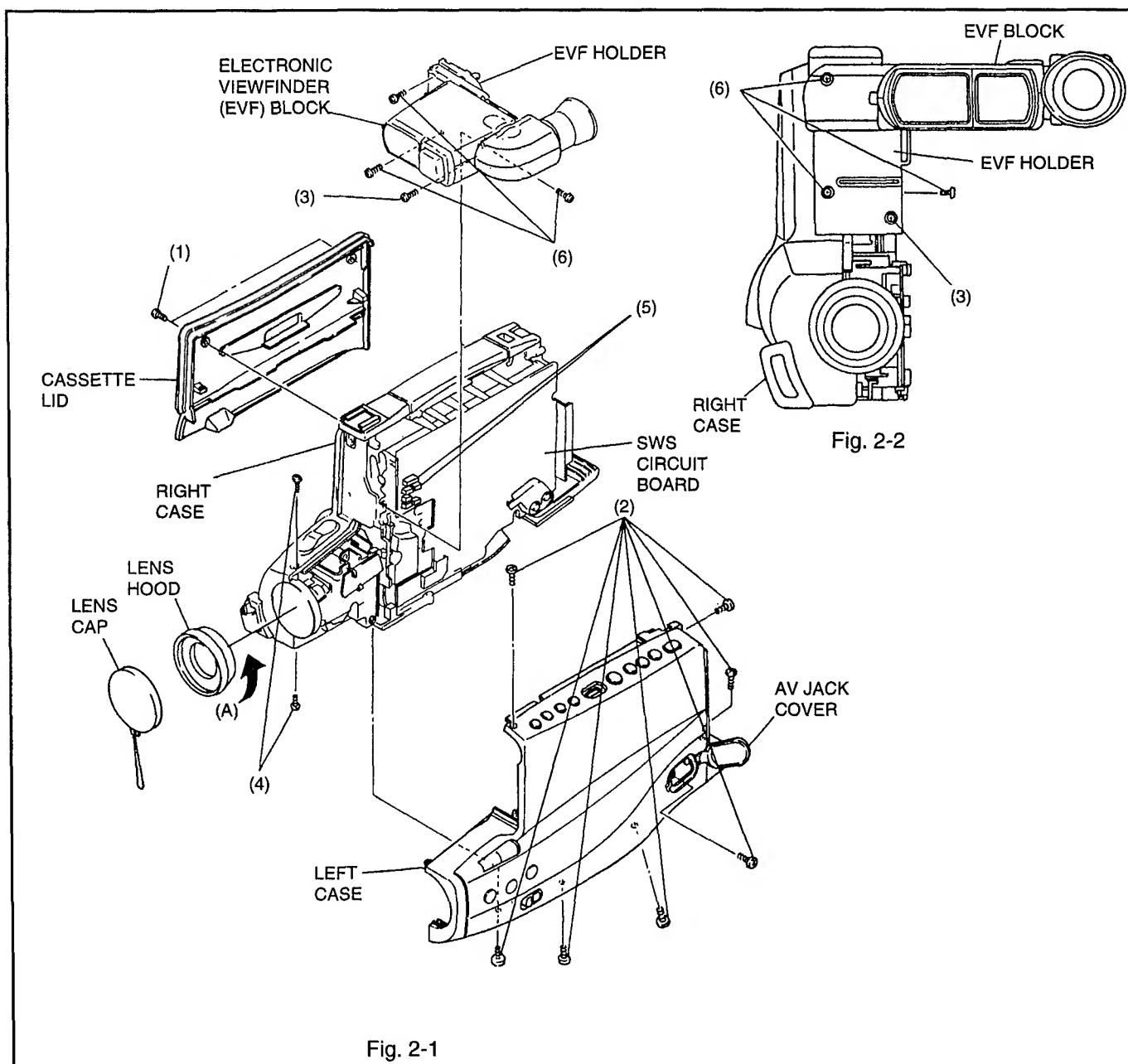
#### ● LEFT CASE

- 1) Set the EVF to the position shown in Fig. 2-2.
- 2) Open the AV jack cover.

- 3) Remove 7 screws (2) holding the left case.
- 4) Remove 1 screw (3) holding the EVF holder.
- 5) Remove 2 screws (4) holding the right case.
- 6) Remove the left case from the right case.

#### ● ELECTRONIC VIEWFINDER (EVF) BLOCK

- 7) Disconnect 2 connectors (5) on the SWS circuit board.
- 8) Remove 3 screws (6) holding the EVF holder.
- 9) Remove the EVF block from the right case.



## 1.2 AV JACK COVER, POWER SWITCH KNOB

### ■ COMPONENTS TO REMOVE IN ADVANCE

- Left Case (Item No.: 1.1)

### ● AV JACK COVER

- 1) Turn the AV jack cover in the direction of arrow (A) and pull it out.

### ● POWER SWITCH KNOB

- 1) Release 2 tabs (1) and remove the power switch knob.

**Note:** When the power switch knob is removed, the spring between the power switch slider and knob holder comes off.

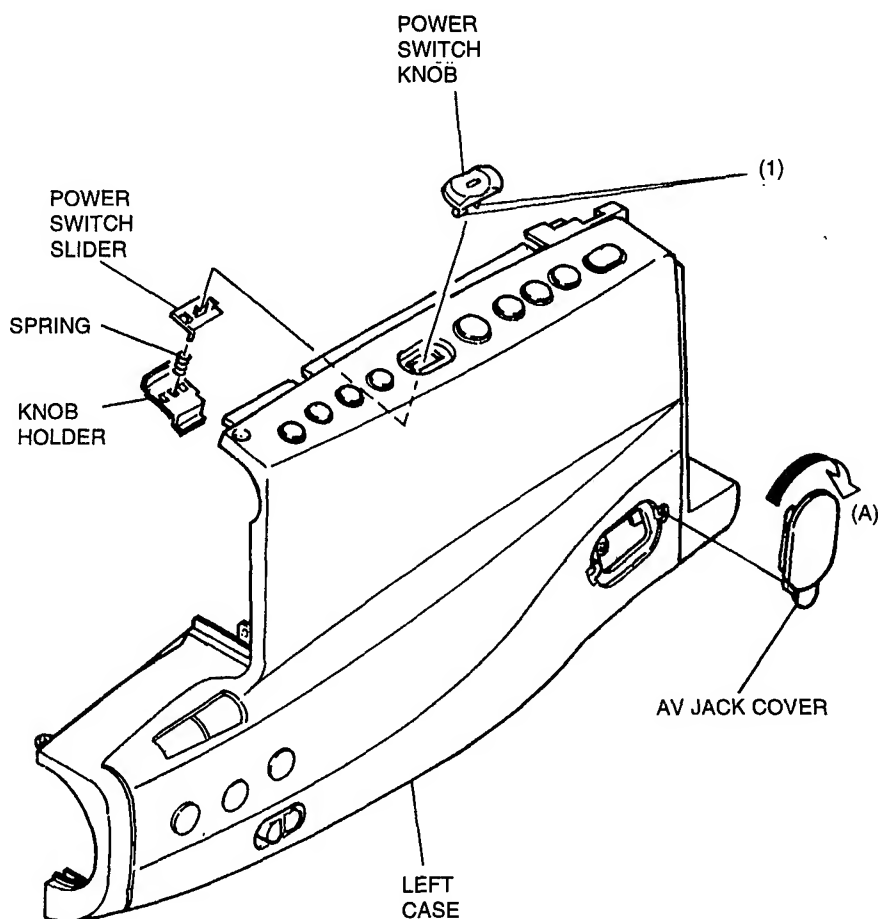


Fig. 2-3

## 1.3 CAMERA BLOCK, TRIPOD MOUNT, VCR BLOCK, RIGHT CASE

### ■ COMPONENTS TO REMOVE IN ADVANCE

- Cassette lid, Left Case, EVF Block (Item No.: 1.1)

**Note:** It is necessary to remove the cassette lid and EVF block when removing only the VCR block.

### ● CAMERA BLOCK

- 1) Disconnect 1 flat cable (1) on the SWS circuit board.
- 2) Remove 3 screws (2) holding the camera block.
- 3) Pull out the camera block from the right case.
- 4) Disconnect 1 connector (3) on the SPC circuit board.

### ● TRIPOD MOUNT

- 5) Release 1 tab (4) and slide the tripod mount in the direction of arrow (A) and pull it out.

### ● VCR BLOCK AND RIGHT CASE (Continued from the tripod mount removal)

- 6) Remove 1 screw (5) holding the VCR block and right case.
- 7) Remove 2 screws (6) holding the VCR block and right case.
- 8) Remove the VCR block from the right case.
- 9) Remove 1 screw (7) holding the shoulder pad.

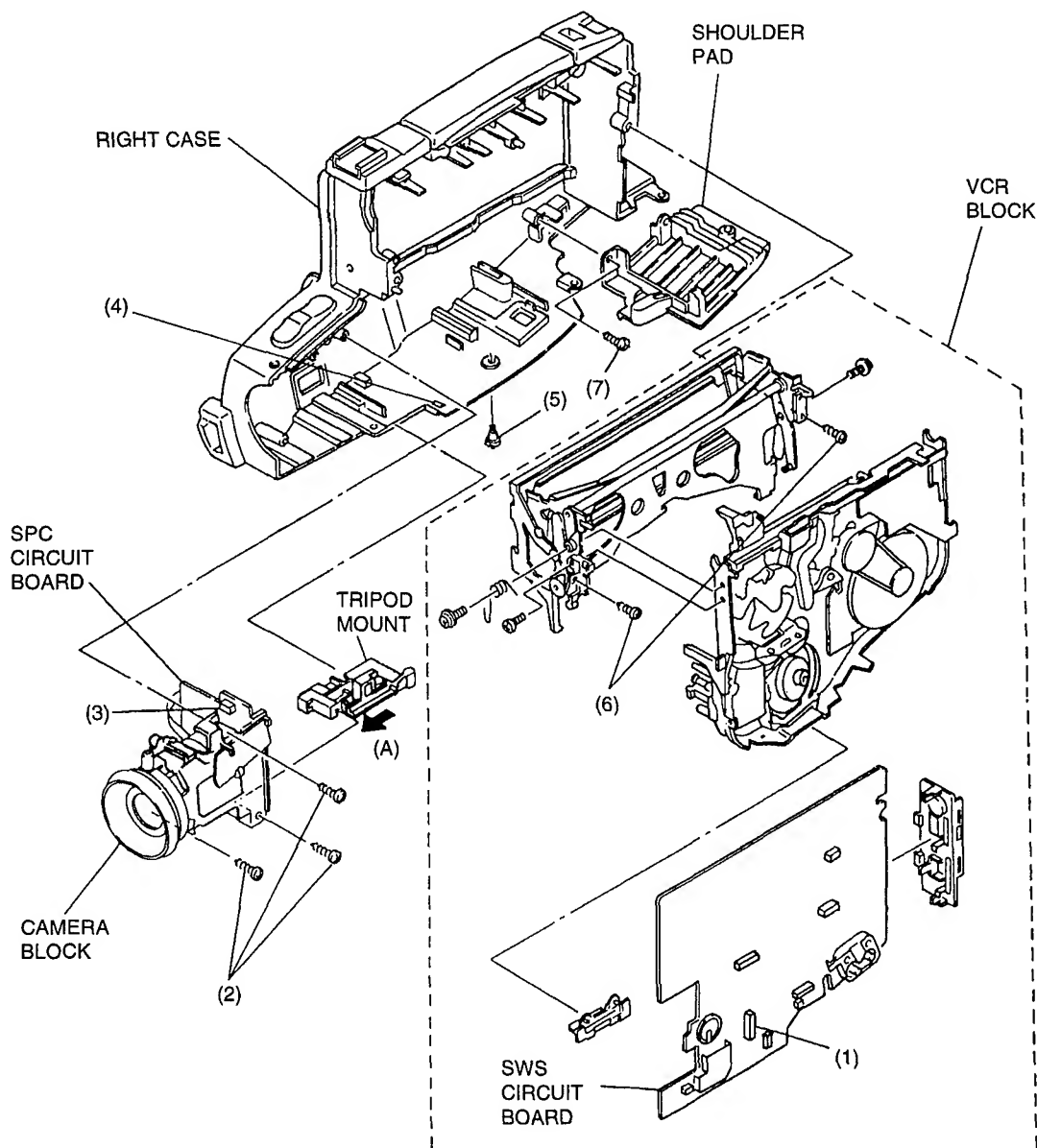


Fig. 2-4

## 1.4 HANDLE, ZOOM SWITCH, HAND STRAP

### ■ COMPONENTS TO REMOVE IN ADVANCE

- Left Case (Item No.: 1.1)
- Camera Block (Item No.: 1.3)  
[When the zoom switch and hand strap are remove.]
- VCR Block (Item No.: 1.3)  
[When the handle is remove.]

### ● HANDLE

- 1) Insert tweezers into hole (A) in the shoe spring to release the tab.
- 2) Pull out the shoe spring in the direction of arrow (B).
- 3) Remove 2 screws (1).
- 4) Move the accessory shoe in the direction of arrow (C) to pull it out.
- 5) Remove 2 screws (2) holding the handle holder-F.

- 6) Remove the handle holder-F in the direction of arrow (D).
- 7) Release the pins from holes (E) in the lever lock holder and then pull out the battery eject button.
- 8) Remove the lever lock.
- 9) Remove 1 screw (3) holding the handle holder-R.
- 10) Remove the handle holder-R in the direction of arrow (F).

### ● ZOOM SWITCH

- 1) Release 4 tabs (4) of the zoom switch.

### ● HAND STRAP

- 1) Remove 2 screws (5) holding the hand strap.
- 2) Remove the hand strap from the right case.

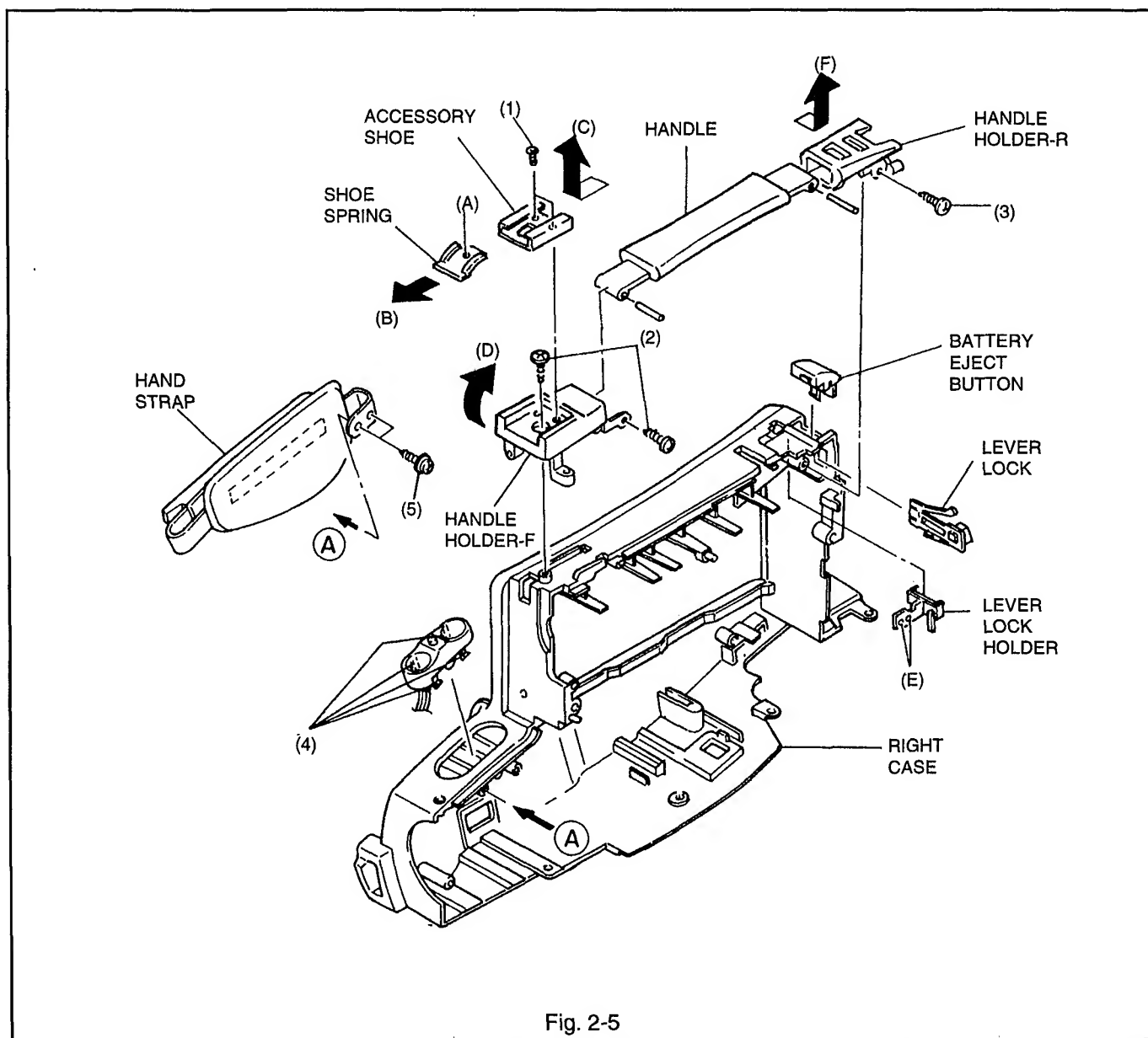


Fig. 2-5

## 1.5 SWS CIRCUIT BOARD, TAPE TRANSPORT MECHANISM

### ■ COMPONENTS TO REMOVE IN ADVANCE

- Cassette Lid, Left Case, EVF Block (Item No.: 1.1)
- Camera Block, Tripod Mount, VCR Block, Right Case (Item No.: 1.3)

### ● SWS CIRCUIT BOARD

- 1) Remove 1 screw (1) holding the GND cable.
- 2) Disconnect 4 connectors (2) on the SWS circuit board.
- 3) Disconnect 4 connectors (3) on the SWS circuit board.
- 4) Disconnect 1 connector (4) on the SWS circuit board.
- 5) Disconnect 2 flat cables (5) on the SWS circuit board.
- 6) Release 2 tabs (6) and open the SWS circuit board in the direction of the arrow.
- 7) Release 2 tabs (7) of the SWS circuit board holder

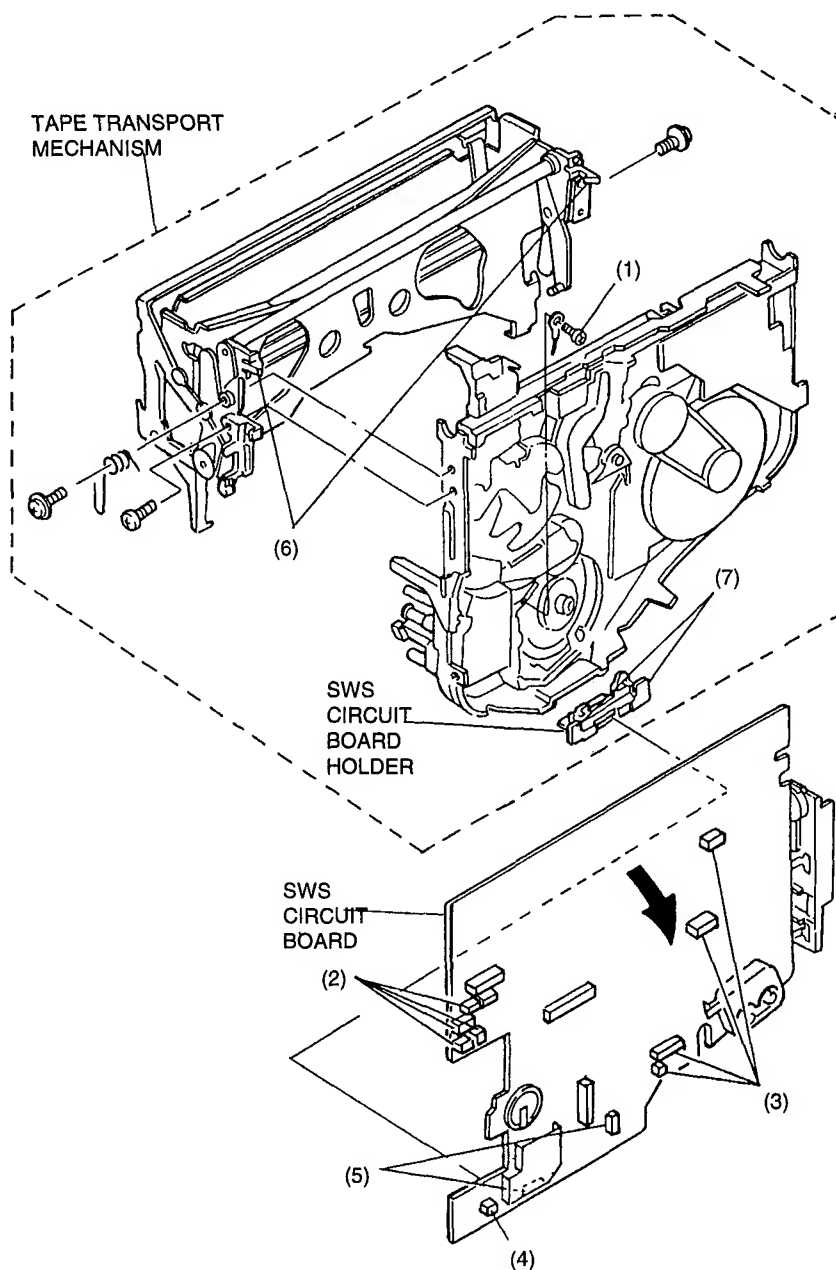


Fig. 2-6

## 1.6 CON CIRCUIT BOARD, HOOD HOLDER, LENS BLOCK, CCD IMAGE SENSOR, SPC CIRCUIT BOARD

### ■ COMPONENTS TO REMOVE IN ADVANCE

- Lens Hood, Left Case (Item No.: 1.1)
- Camera Block (Item No.: 1.3)

### ● CON CIRCUIT BOARD

- 1) Disconnect 1 connector (1) on the CON circuit board.
- 2) Release 2 tabs (2) and remove the CON circuit board.

### ● HOOD HOLDER, LENS BLOCK

**Note :** Remove the CON circuit board in advance from a model no which it is mounted.

- 1) Release 2 tabs (3) and remove the hood holder.

**Note :** When the hood holder is removed, the rubber ring comes off. See the upper left in Fig. 2-7 for reinstalling the rubber ring.

- 2) Disconnect 1 flat cable (4) on the SPC circuit board.
- 3) Remove 3 screws (5) holding the camera frame.
- 4) Remove 2 screws (6) holding the lens block.

**Note:** When the lens block is removed, the crystal filter and sensor rubber come off. Be careful not to damage the crystal filter.

### ● CCD IMAGE SENSOR AND SPC CIRCUIT BOARD

- 5) Unsolder 14 points (7) (terminal of CCD image sensor ) on the SPC circuit board.
- 6) Remove 2 screws (8) holding the SPC circuit board.

**Note:** Be careful not to damage the CCD image sensor. Be sure not to remove the CCD image sensor from the sensor plate.

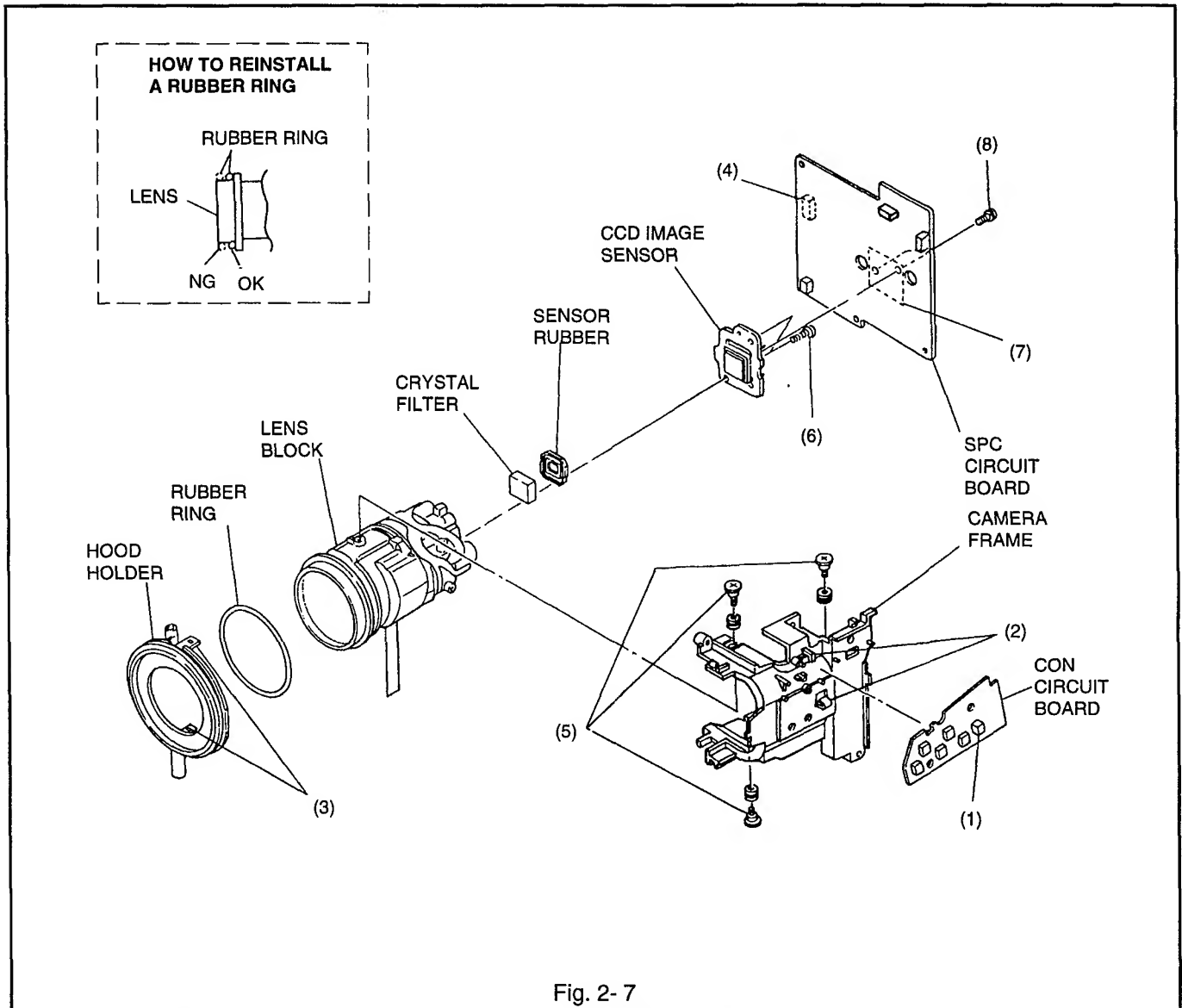


Fig. 2-7

## 2. ELECTRONIC VIEWFINDER (EVF) BLOCK

### 2.1 EVF HOLDER, CABLE GUIDE, CABLE HOLDER

#### ■ COMPONENTS TO REMOVE IN ADVANCE

- EVF Block (Item No.: 1.1)

#### ● EVF HOLDER, CABLE GUIDE, CABLE HOLDER

- 1) Set the EVF to the position shown in Fig. 2-8.
- 2) Remove 1 screw (1) holding the cable guide.
- 3) Insert a thin screwdriver into hole (A) in the EVF holder and then remove the EVF holder in the direction of arrow (B).
- 4) Release 2 tabs (2) of the cable holder.

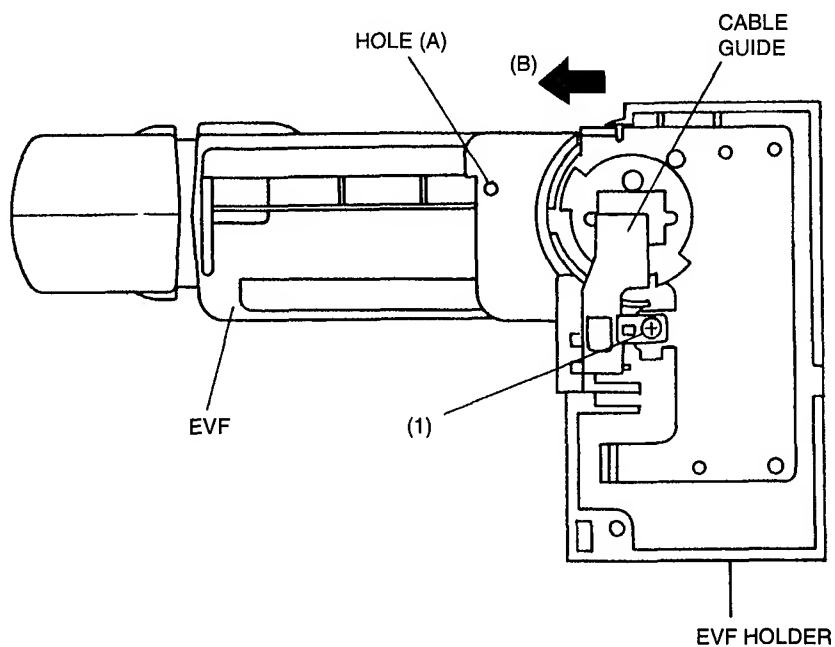


Fig. 2-8

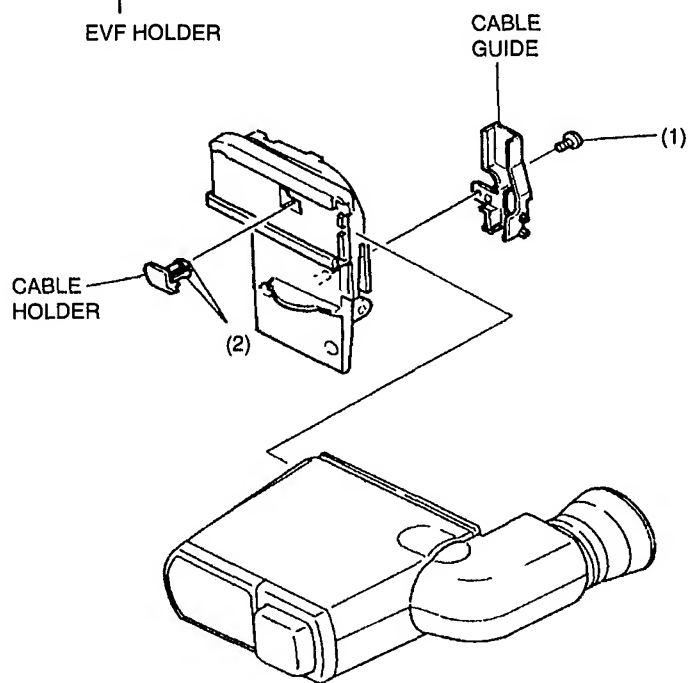


Fig. 2-9

## 2.2 LIGHT COVER, EVF TOP CASE, EVF NECK BLOCK, MICROPHONE (MIC) UNIT, LIGHT TERMINAL, EVF CIRCUIT BOARD, EVF BOTTOM CASE

### ■ COMPONENTS TO REMOVE IN ADVANCE

- EVF Block (Item No.: 1.1)

### ● LIGHT COVER, EVF TOP CASE

- 1) Release 1 tab (1) and remove the light cover.
- 2) Remove 4 screws (2) holding the EVF top and bottom cases.
- 3) Remove the EVF top case from the bottom case.

### ● EVF NECK BLOCK

- 4) Disconnect 1 connector (3) on the EVF circuit board and CRT socket.
- 5) Remove the EVF neck block from the EVF bottom case.

### ● MICROPHONE (MIC) UNIT

- 4) Disconnect 1 connector (4) on the MIC.
- 5) Remove the MIC from the EVF bottom case.

### ● LIGHT TERMINAL

- 4) Disconnect 1 connector (5) on the EVF circuit board.
- 5) Pull out the cable holder from the EVF bottom case.
- 6) Pull out the light holder from the EVF bottom case.
- 7) Remove 1 screw (6) holding the light terminal.

### ● ELECTRONIC VIEWFINDER (EVF) CIRCUIT BOARD, EVF BOTTOM CASE

- 8) Remove the EVF circuit board from the EVF bottom case.

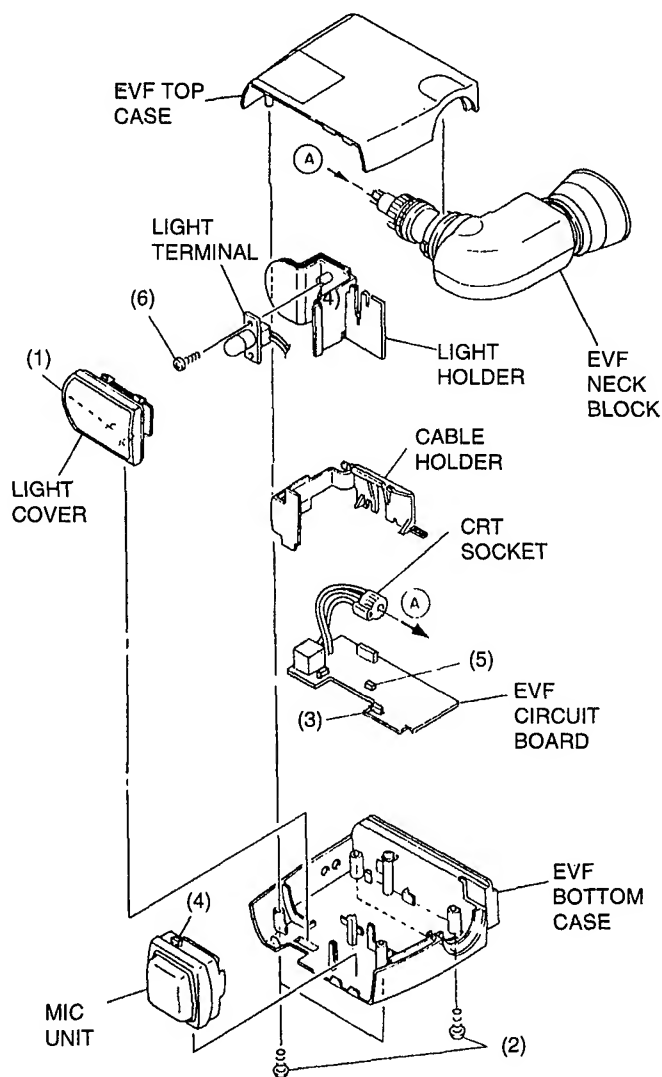


Fig. 2-10



## 2.3 EYE CUP, NECK TOP CASE, NECK BOTTOM CASE, MIRROR, EVF LENS, CRT FRAME, CRT

### ■ COMPONENTS TO REMOVE IN ADVANCE

- EVF Block (Item No.: 1.1)
- Light Cover, EVF Top Case, Neck Block (Item No.: 2.2)

- 5) Remove the mirror from the neck bottom case.
- 6) Remove the EVF lens from the neck bottom case.
- 7) Remove the CRT unit from the neck bottom case.

### ● EYE CUP

- 1) Turn the eye cup in the direction of arrow (A).
- 2) Remove the eye cup in the direction of arrow (B).

### ● CRT FRAME, CRT

- 8) Remove 1 screw (2) holding the CRT frame and CRT.
- 9) Remove the CRT frame the CRT.

### ● NECK TOP CASE, NECK BOTTOM CASE

- 3) Remove 1 screw (1) holding the neck bottom case and neck top case.
- 4) Remove the neck top case from the neck bottom case.

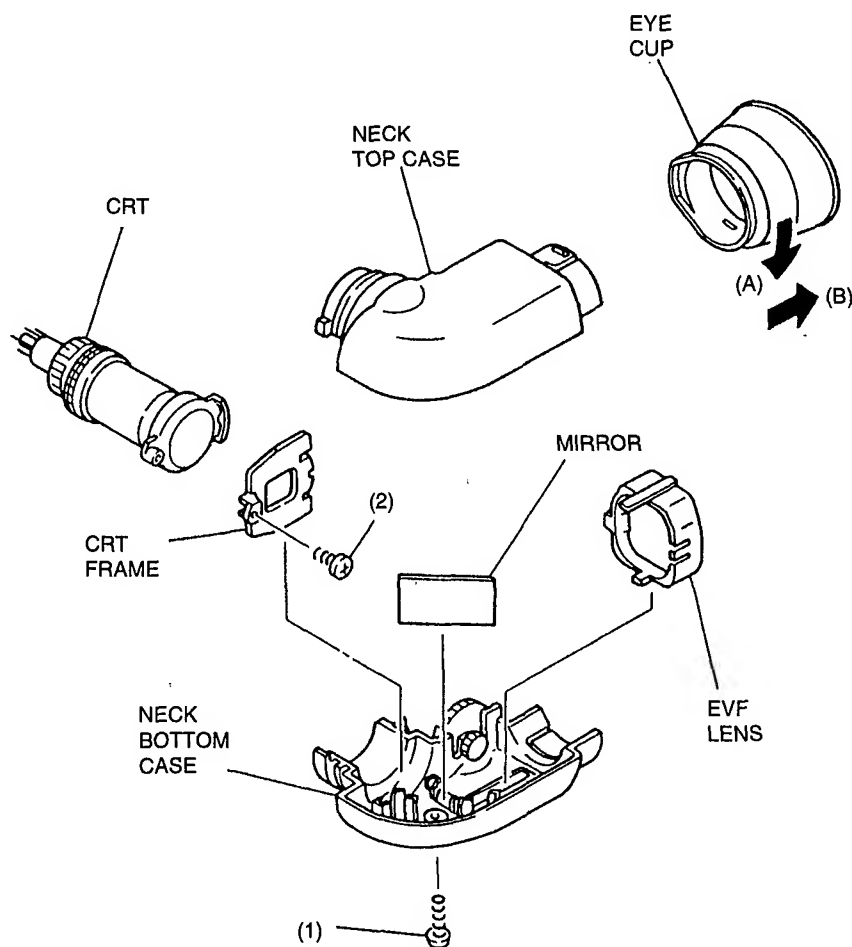


Fig. 2-11

# CHAPTER 3 ELECTRICAL ADJUSTMENT

## 1. CAMERA SECTION ADJUSTMENTS

### 1.1 CIRCUIT BOARD LOCATION

1. SPC (Sensor/Process) Circuit Board
2. TSS (Supply Sensor) Circuit Board
3. ERS (Take-up Sensor) Circuit Board
4. SWS (Main) Circuit Board
5. CON (Control) Circuit Board

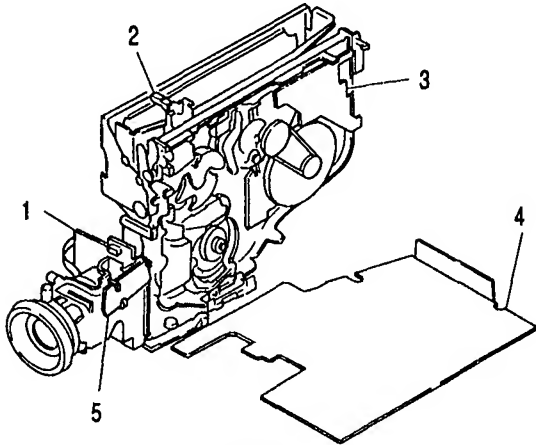


Fig. 3-1

### 1.2 TEST EQUIPMENT NECESSARY FOR ADJUSTMENT

#### Test Equipment

Oscilloscope (dual trace)  
{Vectorscope}  
Digital Voltmeter (DVM)  
Color Video Monitor

#### Jigs, etc.

Adjustment Floppy Disk  
Personal Computer  
Personal Computer 9-pin or 25-pin (RS232C) Cable  
DSP-R Jig  
3P Extension Cable  
6P Extension Cable  
Light Box (3100° K)  
Light Balancing Filter C12  
DC Power Supply (DC9.6V/3A)  
DC Power Supply (DC5V/1A)

### 1.3 ADJUSTMENT CONDITION

- 1) Check that the VCR section has been adjusted correctly before adjusting the camera section.
- 2) Use a light box with minimum flickering. Control the color temperature of the light box strictly.
- 3) Connect this unit, a power supply and a color video monitor as shown in Fig. 3-2.
- 4) When using the video out (AV OUT) to perform adjustment, be sure to terminate the AV OUT jack with 75 ohms.
- 5) Place the chart (light box) approx. 30cm away from the camera (lens surface) when otherwise not specified.

- 6) Point the camera at the chart to full the video period when otherwise not specified.
- 7) Use the 10:1 probe of the oscilloscope when otherwise not specified.
- 8) When "Trigger the oscilloscope internally" is specified, set the time base of the oscilloscope to 10 $\mu$ s/div.

### 1.4 PRESET POSITIONS OF SWITCHES AND CONTROLS DURING ADJUSTMENT

CAM/OFF/VIDEO switch ..... "CAM" position  
DISPLAY ..... Not Display mode  
DATE/TIME ..... Not Display mode  
TITLE ..... Not Display mode  
LIGHT switch ..... "OFF" position  
INST. ZOOM ..... Not Display mode  
DIGITAL FADE ..... OFF (Normal) mode  
DIGITAL EFFECT ..... OFF (Normal) mode  
AV IN/OUT ..... "OUT" position

### 1.5 LIST OF CHARTS FOR CAMERA ADJUSTMENT

Table 3-1

GRAY SCALE CHART (11 steps)	COLOR BAR CHART	RESOLUTION CHART
BACKFOCUS ADJUSTMENT CHART		

## 1.6 CONNECTION FOR ADJUSTMENT

Remove the component, etc. listed below first, referring to "CHAPTER 2 DISASSEMBLY". (See Fig. 3-2)

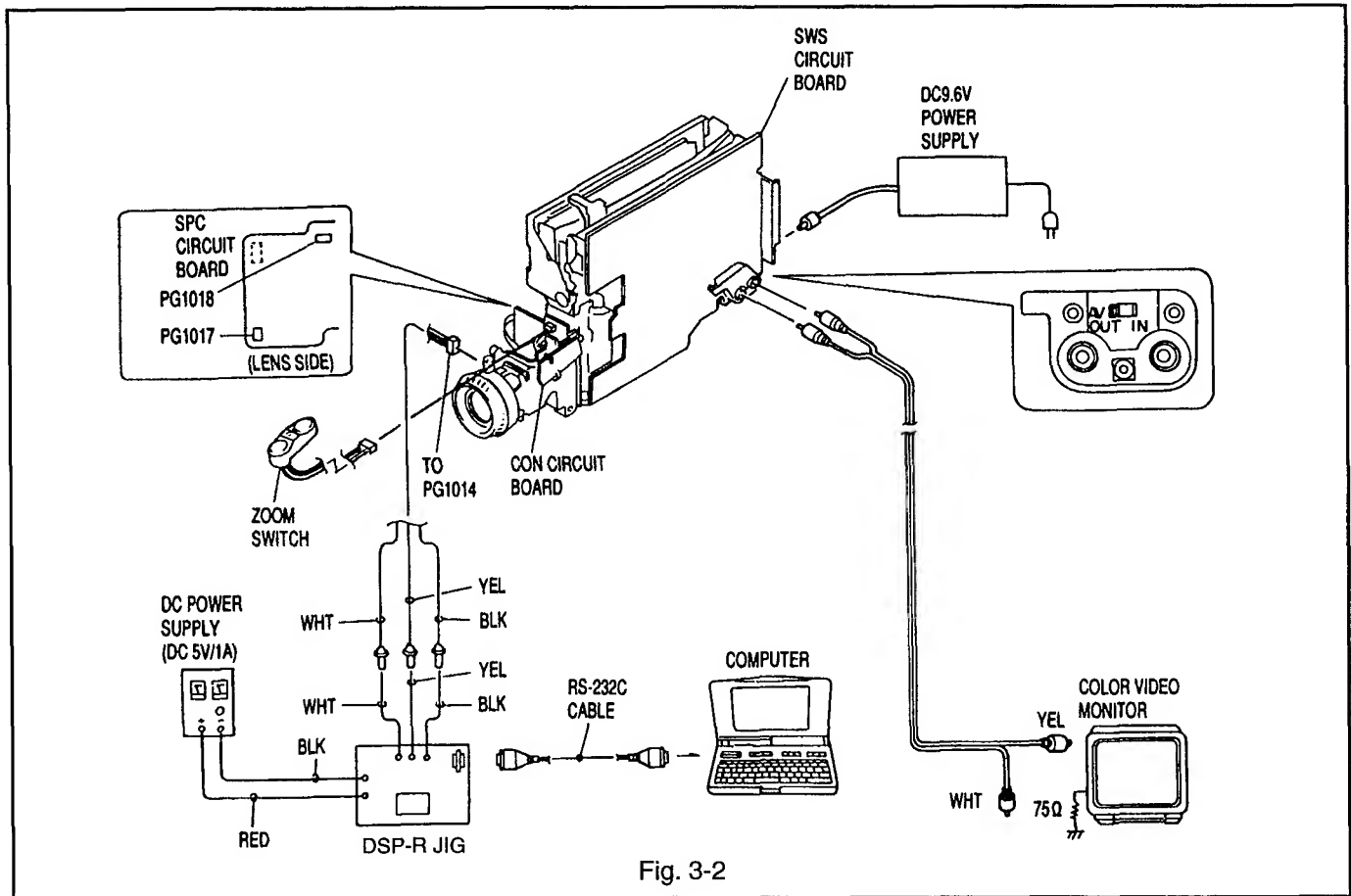


Fig. 3-2

## 1.7 ADJUSTMENTS AFTER REPLACING MAJOR COMPONENTS IN THE CAMERA SECTION

After replacing major components, perform adjustments, referring to the table below.

The following table shows the minimum adjustments required after major components are replaced.

The table below may not apply when several components are replaced, depending on the symptom of the defect.

Table 3-2

ITEM No.	NAME OF ADJUSTMENT	NAME OF MAJOR COMPONENTS									
		SPC Board	IC1107 (EEP- ROM)	IC1001	IC1101	IC1103	IC1106	IC1201			
INITIAL SETTING BY MODEL		●	●				●				
ELECTRIC VOLUME ADJUSTMENT PROCEDURE											
(1)	CDS Offset Adjustment	●	●		●		●				
(2)	CDS Smpling Pulse Adjustment	●	●			●	●				
DIGITAL ADJUSTMENT PROCEDURE											
(1)	Auto Iris Control Adjustment	●	●	●	●		●	●			
(2)	Knee Adjustment	●	●		●		●				
(3)	Matrix Adjustment	●	●	●	●		●				
(4)	White Balance Adjustment	●	●	●	●		●				
(5)	Chroma Gain Adjustment	●	●	●	●		●				
AUTOFOCUS ADJUSTMENT PROCEDURE											
(1)	Zoom Trace Adjustment	●	●				●				
(2)	AF Noise Level Adjustment	●	●				●				
SPOT NOISE ADJUSTMENT PROCEDURE		●	●				●				

## 1.8 ADJUSTMENT PROCEDURE

- Note:** 1. The digital adjustment program for camera is called the MAP (Manual Adjustment Program).
2. To complete adjustment, press the [ESC] (escape) key twice to restore the MS-DOS screen and then turn off the camera recorder and jigs.

### 1.8.1 How to Start the Adjustment Programme (MAP)

**Note:** The following describes an example of the instructions of the personal computer and the menu display; they are different depending on the personal computer manufacturer and model.  
Refer to the instruction manual of personal computer.

- 1) Turn the personal computer on and start the MS-DOS system. (Fig. 3-3)  
(Refer to the instruction manual of the personal computer for how to start the computer.)
- 2) Load the adjustment floppy disk into disk drive A and press **A:** then [ENTER]. (A may be small letter.) (Fig. 3-4)  
(If the adjustment floppy disk is loaded into disk drive B, press **B:** then [ENTER] ).
- 3) Press **MAP IBM** (SPACE) 1 then [ENTER] (MAP and IBM may be small letters).  
The digital adjustment program (MAP: Manual Adjustment Program) starts and the MODEL SELECT shown Fig. 3-7 appears.  
(When you use a personal computer with two serial interface connectors and connect the DSP-R jig to serial interface connector 2, press MAP IBM 2.)
- 4) Select the number according to the model.  
If [ESC] (escape) is pressed, the display before the MAP starts (MS-DOS) is restored.

- Note:** 1. If you specify the wrong model, press [ESC] (escape) to restore the MODEL SELECT display, then specify the correct model.
2. If you select number without a model name by mistake, the message shown in Fig. 3-10 will appear in the computer's display.  
Press any key to return the display to Fig. 3-7 (MODEL SELECT).
3. If there are more than 5 models and **P** key is pressed, the computer's display changes to the next page.

```
C>
```

Fig. 3-3

Load the camera adj. floppy disk into disk drive A.

Press **A:** [ENTER].

```
C>A:  
A>
```

Fig. 3-4

Press **MAP IBM** (SPACE) 1 [ENTER].

```
C>A:  
A>MAP IBM 1
```

Fig. 3-5

```
MANUAL ADJUSTMENT PROGRAM FOR SERVICE STATION  
COPYRIGHT (C) HITACHI LTD
```

Fig. 3-6

#### MODEL SELECT MENU

```
*****  
MODEL SELECT  
*****  
[1]  xxxxxx  
[2]  xxxxxx  
[3]  xxxxxx  
[4]  xxxxxx  
[5]  xxxxxx  
[P]  NEXT SELECTION  
[ESC] END  
PLEASE SELECT THE TYPE OF THE SET.  
PRESS [1] - [5] OR [P] OR [ESC]
```

Fig. 3-7

Press numeric key.

5) Press **Y** to display MANUAL ADJUSTMENT MENU.  
(See Fig. 3-8, 3-9)

- Refer to "1.8.2 Initial Setting by Model" for DATA INITIALIZE.
- Refer to "1.8.3 Electric Volume Adjustment Procedure" for ELECTRIC VOLUME.
- Refer to "1.8.4 Digital Adjustment Procedure" for ADJUSTMENT.
- Refer to "1.8.5 Autofocus Adjustment Procedure" for AUTO FOCUS.
- Refer to "1.8.6 Spot Noise Adjustment Procedure" for SPOT NOISE.

Selected model is xxxxxx  
Are you sure? (Y/N)

Fig. 3-8

Press **Y** key.

#### MAIN MENU

\*\*\*\*\*  
MANUAL ADJUSTMENT PROGRAM  
\*\*\*\*\*

[A] DATA INITIALIZE  
[B] ELECTRIC VOLUME  
[C] ADJUSTMENT  
[D] AUTO FOCUS  
[E] SPOT NOISE  
[ESC] END  
PRESS SELECT [A] - [E] OR [ESC]

Fig. 3-9

#### MESSAGE WHEN OPERATED BY MISTAKE

CAN NOT FIND THE DATA FILE  
\*\*\* PRESS ANY KEY \*\*\*

Fig. 3-10

## 1.8.2 Initial Setting by Model

**Note:** This item describes how to initialize the EEP ROM.  
Be sure to perform this item after replacing EEP ROM or SPC circuit board.

When other components are replaced, normally, it is not necessary to initialize the EEP ROM.  
Press [ESC] (escape) to return the computer's display to MAIN MENU.

- 1) Start the MAP, referring to "1.8.1 How to Start the Adjustment Program (MAP)".
- 2) Press **A** to select DATA INITIALIZE. (Figs. 3-11, 3-12)
- 3) Press **Y** to start. (Figs. 3-12, 3-13)  
(Press **N** to return to MAIN MENU)
- 4) If there are no abnormalities in the camera/recorder, the message shown in Fig. 3-13 is displayed in the computer's display for a while, and then the message informing you that the initial setting has been completed (shown in Fig. 3-14) is displayed.

#### MAIN MENU

\*\*\*\*\*  
MANUAL ADJUSTMENT PROGRAM  
\*\*\*\*\*

[A] DATA INITIALIZE  
[B] ELECTRIC VOLUME  
[C] ADJUSTMENT  
[D] AUTO FOCUS  
[E] SPOT NOISE  
[ESC] END  
PRESS SELECT [A] - [E] OR [ESC]

Fig. 3-11

Press **A** key.

<< DATA WRITING >>  
START TO SEND DATA. (Y/N)

Fig. 3-12

Press **Y** key.

<< DATA WRITING >>  
PLEASE WAIT A MOMENT

Fig. 3-13

- 5) If the message shown in Fig. 3-14 appears in the computer's display, press any key. The computer's display returns to Fig. 3-11 (MAIN MENU).
- 6) Be sure to perform the following adjustments after completing the initial setting.
  - 1.8.3 Electric Volume Adjustment Procedure
  - 1.8.4 Digital Adjustment Procedure
  - 1.8.5 Autofocus Adjustment Procedure
  - 1.8.6 Spot Noise Adjustment Procedure

**Note:** If an error message appears in the computer's display, refer to "Error Messages". If a key is pressed after the error message appears, the computer's display returns to the MAIN MENU (Fig. 3-11)

### 1.8.3 Electric Volume Adjustment Procedure

**Note:** When EEP ROM or SPC circuit board is replaced, initialize the EEP ROM, referring to "1.8.2 Initial Setting By Model" then perform all the electric volume adjustments.

- 1) Start the MAP, referring to "1.8.1 How to Start the Adjustment Program (MAP)".
- 2) Press **B** to select ELETRIC VOLUME. (Figs. 3-15, 3-16)
- 3) Select the number of the required adjustment.  
( If [ESC] (escape) is pressed, the computer's display returns to MAIN MENU).

- Note:**
1. To complete adjustment, press the [ESC] (escape) key twice to restore the MS-DOS screen and then turn off the camera/recorder and jig.
  2. When an error message appears during adjustment, refer to "Error Messages".

```
<< DATA WRITING >>
PLEASE WAIT A MOMENT
FINISHED WRITING DATA
PRESS ANY KEY
```

Fig. 3-14

Press any key to return to Fig. 3-11.

#### MAIN MENU

```
*****
MANUAL ADJUSTMENT PROGRAM
*****
[A]  DATA INITIALIZE
[B]  ELECTRIC VOLUME
[C]  ADJUSTMENT
[D]  AUTO FOCUS
[E]  SPOT NOISE
[ESC] END
PRESS SELECT [A] - [F] OR [ESC]
```

Fig. 3-15

Press **B** key.

#### ELECTRIC VOLUME ADJ. MENU

```
*****
ELECTRIC VOLUME
*****
[1]  CDS OFFSET
[2]  CDS SAMPLING PULSE
[ESC] RETURN TO MAIN MENU

PLEASE SELECT [1], [2] OR [ESC]
```

Fig. 3-16

## (1) CDS Offset Adjustment

<b>Purpose:</b>	To determine the DC offset levels when the AGC is set to the minimum and maximum gains.
<b>Incompleted phenomenon:</b>	When a subject is illuminated brightly in low lighting, a white band appears across the top of the screen.

**Procedure:**

### **ELECTRIC VOLUME ADJ. MENU**

```

*****
ELECTRIC VOLUME
*****
[1]  CDS OFFSET
:
  
```

Press 1 key to select the CDS OFFSET.

```

<< ADJUSTMENT OF CDS OFFSET >>
PLEASE WAIT AROUND 50 SEC.
  
```

```

<< ADJUSTMENT OF CDS OFFSET >>
FINISHED WRITING DATA.
ADJUSTMENT COMPLETED.
PRESS ANY KEY.
  
```

Press any key to return to ELECTRIC VOLUME MENU.  
Turn the power off for 5 seconds and then on again.

## (2) CDS Sampling Pulse Adjustment

<b>Purpose:</b>	To synchronize the horizontal sync signal with the subcarrier frequency.
<b>Incompleted phenomenon:</b>	The picture is distorted.
<b>Procedure:</b>	

### **ELECTRIC VOLUME ADJ. MENU**

```

*****
ELECTRIC VOLUME
*****
:
[2]  CDS SAMPLING PULSE
:
  
```

Press 2 key to select the CDS SAMPLING PULSE.

```

<< ADJUSTMENT OF CDS SAMPLING PULSE >>
<< NOW ADJUSTING >>
  
```

```

<< ADJUSTMENT OF CDS SAMPLING PULSE >>
FINISHED WRITING DATA.
ADJUSTMENT COMPLETED.
PRESS ANY KEY.
  
```

Press any key to return to ELECTRIC VOLUME MENU.

## 1.8.4 Digital Adjustment Procedure

- Note:**
- When EEP ROM or SPC circuit board is replaced, initialize the EEP ROM, referring to "1.8.2 Initial Setting By Model" then perform all the digital adjustments.
  - When an error message appears during adjustment, refer to "Error Messages". If a key is pressed after an error message appears, the ADJUSTMENT MENU is restored.

1) Start the MAP, referring to "1.8.1 How to Start the Adjustment Programme (MAP)".

2) Press **C** to select ADJUSTMENT. (Figs. 3-17, 3-18)

3) Select the number of the required adjustment.  
(If [ESC] (escape) is pressed, the computer's display returns to MAIN MENU).

- Note:**
- To complete adjustment, press the [ESC] (escape) key twice to restore the MS-DOS screen and then turn off the camera/recorder and jig.
  - [1] AUTO IRIS CONTROL and [2] KNEE procedures must always be performed in sequence

### **MAIN MENU**

```

*****
MANUAL ADJUSTMENT PROGRAM
*****
[A]  DATA INITIALIZE
[B]  ELECTRIC VOLUME
[C]  ADJUSTMENT
[D]  AUTO FOCUS
[E]  SPOT NOISE
[ESC] END
PRESS SELECT [A] - [E] OR [ESC]
  
```

Fig. 3-17

Press **C** key.

### **ADJUSTMRNT MENU**

```

*****
MANUAL ADJUSTMENT PROGRAM
*****
[1]  AUTO IRIS CONTROL
[2]  KNEE
[3]  MATRIX
[4]  WHITE BALANCE
[5]  CHROMA GAIN
[ESC] RETURN TO MAIN MENU
PLEASE SELECT [1] - [5] OR [ESC]
  
```

Fig. 3-18

## (1) Auto Iris Control Adjustment

**Purpose:** To set the iris control data.  
**Incompleted phenomenon:** ·The picture becomes too bright.  
·The picture becomes too dark.  
**Condition:** Point the camera at the light box without a chart to full the screen (at wide angle).

**Procedure:**

### ADJUSTMRNT MENU

```
*****
MANUAL ADJUSTMENT PROGRAM
*****
[1]  AUTO IRIS CONTROL
      :
```

Press 1 key to select the AUTO IRIS CONTROL.

<< ADJUSTMENT OF IRIS OPEN & CLOSE >>  
PLEASE WAIT AROUND 10 SEC.

<< ADJUSTMENT OF IRIS OPEN & CLOSE >>  
PLEASE WAIT AROUND 10 SEC.  
DATA WRITEN INTO EEPROM  
ADJUSTMENT FINISHED  
PRESS ANY KEY

Press any key, and the display changes as follows.

<< ADJUSTMENT OF IRIS >>  
PLEASE WAIT AROUND 20 SEC.

§1

<< ADJUSTMENT OF IRIS >>  
PLEASE WAIT AROUND 20 SEC.  
ROUGH ADJUSTMENT : xx TIMES  
FINE ADJUSTMENT : xx TIMES  
ADJUSTMENT FINISHED  
PRESS ANY KEY

Press any key, and the display changes as follows.

<< ADJUSTMENT OF HALLCURVE >>  
PLEASE WAIT AROUND 30 SEC.

§2

<< ADJUSTMENT OF HALLCURVE >>  
PLEASE WAIT AROUND 30 SEC.  
\*  
ADJUSTMENT POINT 0 1 2 3 4 5 6 7 8 9 A B C

<< ADJUSTMENT OF HALLCURVE >>  
PLEASE WAIT AROUND 30 SEC.

\*\*\*\*\*  
ADJUSTMENT POINT 0 1 2 3 4 5 6 7 8 9 A B C  
DATA WRITEN INTO EEPROM  
ADJUSTMENT FINISHED  
PRESS ANY KEY

Press any key to return to ADJUSTMENT MENU.  
Turn the power off for 5 seconds and then on again.

- Note:** 1. With some units the following parameter may not be displayed in the display marked §1.  
This is normal; continue adjustment.  
ROUGH ADJUSTMENT: xx TIMES  
2. The \* mark flashes above the numerals and letters in sequence in the display marked §2.



## (2) Knee Adjustment (Fig. 3-19)

<b>Purpose:</b>	To determine the knee level.
<b>Incompleted phenomenon:</b>	Color in the very bright section is defective.
<b>Test Point:</b>	Video out (AV OUT)
<b>Equipment:</b>	Ocsilloscope (Waveform monitor)
<b>Condition:</b>	Point the camera at the gray scale chart.
<b>Procedure:</b>	

### ADJUSTMRNT MENU

```

*****
MANUAL ADJUSTMENT PROGRAM
*****
:
[2]  KNEE
:

```

Press **2** key to select the KNEE.

```

<< KNEE ADJUSTMENT >> STEP 1
* THIS ADJUSTMENT ONLY NEEDED AFTER
  REPLACING IC1101 OR IC1107.
* The [1] IRIS CONTROL ADJUSTMENT SHOULD
  HAVE JUST BEEN COMPLETED BEFORE
  PERFORMING THE FOLLOWING KNEE
  ADJUSTMENT PROCEDURE.
PLEASE POINT AT THE CHART AND
  PRESS THE FOLLOWING KEY
RETURN TO MENU      [ESC]
GO TO NEXT STEP    [ENTER]

```

Press [Enter] key.

```

<< KNEE ADJUSTMENT >> STEP 1
<< WAIT A MOMENT >>

```

```

<< KNEE ADJUSTMENT >> STEP 2

SET LUMINANCE LEVEL TO
  100 (+/- 5) IRE OR 715 (+/- 35) mV
ROUGH ADJUSTMENT
[U]      UP
[D]      DOWN
FINE ADJUSTMENT
[Ctrl]+[U]  UP
[Ctrl]+[D]  DOWN
[ENTER]    DICISION

```

Press the **U** and **D** keys to set the amplitude level to around 715mVp-p.

Press the [Ctrl] key and hold it down, then press the **U** and **D** keys to adjust the amplitude level 715mVp-p  $\pm$  35mV.

Press [Enter] key.

```

<< KNEE ADJUSTMENT >> STEP 3
ADJUST THE LUMINANCE LEVEL TO
MATCH THE LEVEL FROM STEP 2
ROUGH ADJUSTMENT
[U]      UP
[D]      DOWN
FINE ADJUSTMENT
[Ctrl]+[U]  UP
[Ctrl]+[D]  DOWN

[C] REREAD THE LEVEL FROM STEP 2
[ENTER]    DICISION

```

Press the **U** and **D** keys to bring the amplitude level near to the level in step 2.

Press the [Ctrl] key and hold it down, then press the **U** and **D** keys to match the amplitude level to that in step 2.

**Note:** Press the **C** key. The level in step 2 can be checked.

```

<< KNEE ADJUSTMENT >> STEP 3
WAVEFORM ON OSCILLOSCOPE IS NOW
DISPLAYING AMPLITUDE AS SET IN STEP 2
(PRESS C TO RETURN TO STEP 3 MENU)

```

Press [Enter] key.

```

<< KNEE ADJUSTMENT >> STEP 3
WRITING EEPROM NOW

```

```

<< KNEE ADJUSTMENT >>
COMPLETE
PRESS ANY KEY

```

Press any key to return to ADJUSTMENT MENU.

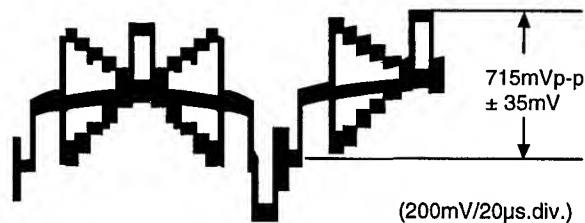


Fig. 3-19

### (3) Matrix Adjustment (Fig. 3-20)

<b>Purpose:</b>	To compensate for unevenness in the chroma signal.
<b>Incompleted phenomenon:</b>	Color reproduction becomes defective.
<b>Test Point:</b>	Video out (AV OUT)
<b>Equipment:</b>	Ocsilloscope
<b>Condition:</b>	Point the camera at the colour bar chart.
<b>Procedure:</b>	

#### ADJUSTMRNT MENU

```

*****
MANUAL ADJUSTMENT PROGRAM
*****
:
[3]  MATRIX
:

```

Press **3** key to select the MATRIX.

```

<< ADJUSTMENT OF BLUE MATRIX >>
ROUGH ADJUSTMENT
[U]      UP
[D]      DOWN
FINE ADJUSTMENT
[Ctrl] + [U]  UP
[Ctrl] + [D]  DOWN

[ENTER]  SAVE & RETURN TO MENU
[ESC]    QUIT

```

Press the **D** key to minimize the yellow (YEL) level.  
 Press the **U** key so the ratio between yellow (YEL) and blue (BLU) levels is 1:2.  
 Press the [Ctrl] key and hold it down, then press the **U** and **D** keys so the ratio between yellow (YEL) and blue (BLU) levels is 1:2.

Press [Enter] key, and the display changes as follows.

```

<< ADJUSTMENT OF BLUE MATRIX >>
DATA WRITING TO EEPROM

```

```

<< ADJUSTMENT OF BLUE MATRIX >>
ADJUSTMENT FINISHED
PRESS ANY KEY

```

Press any key to return to ADJUSTMENT MENU.

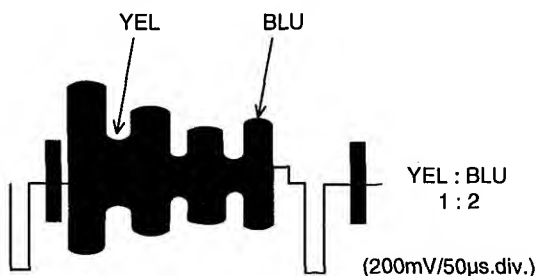


Fig. 3-20

### (4) White Balance Adjustment

<b>Purpose:</b>	To set white balance under the color temperature which becomes a reference for the auto white balance circuit.
<b>Incompleted phenomenon:</b>	Color of the subject is different from that of the picture. A white subject is not seen as white.
<b>Test Point:</b>	Video out (AV OUT)
<b>Condition:</b>	Attach a C12 filter. Point the camera at the gray scale chart (wide angle).

#### Procedure:

#### ADJUSTMRNT MENU

```

*****
MANUAL ADJUSTMENT PROGRAM
*****
:
[4]  WHITE BALANCE
:

```

Press **4** key to select the WHITE BALANCE.

```

<< WHITE BALANCE ADJUSTMENT >>
INPUT DATA OF OFFSET FOR R-B --> 00

```

Press **0(ZERO)0(ZERO)** to input the data.

Press [Enter] key, and the display changes as follows.

```

<< WHITE BALANCE ADJUSTMENT >>
INPUT DATA OF OFFSET FOR Mg-G --> 00

```

Press **0(ZERO)0(ZERO)** to input the data.

Press [Enter] key, and the display changes as follows.

```

<< WHITE BALANCE ADJUSTMENT >>
PLEASE WAIT A MOMENT.

```

```

<< WHITE BALANCE ADJUSTMENT >>
ADJUSTMENT COMPLETED.
COMPLETED EEPROM WRITE.
PRESS ANY KEY.

```

Press any key to return to ADJUSTMENT MENU.

## (5) Chroma Gain Adjustment (Figs. 3-21, 3-22)

<b>Purpose:</b>	To set the color saturation under the reference color temperature.
<b>Incompleted phenomenon:</b>	Color of the picture is denser than that of the subject. Color of the picture is lighter than that of the subject.
<b>Test Point:</b>	Video out (AV OUT)
<b>Equipment:</b>	Oscilloscope (Vectroscope)
<b>Condition:</b>	Attach a C12 filter. Point the camera at the color bar chart.

### Procedure:

#### ADJUSTMENT MENU

```
*****
MANUAL ADJUSTMENT PROGRAM
*****
:
[5]  CHROMA GAIN
:
```

Press 5 key to select the CHROMA GAIN.

```
« ADJUSTMENT OF CHROMA GAIN »
ROUGH ADJUSTMENT
[U]      CHROMA GAIN UP
[D]      CHROMA GAIN DOWN
FINE ADJUSTMENT
[Ctrl] + [U]  CHROMA GAIN UP
[Ctrl] + [D]  CHROMA GAIN DOWN

[ENTER]  SAVE & RETURN TO MENU
[ESC]    QUIT
```

#### WHEN USING AN OSCILLOSCOPE:

Press the **U** and **D** keys to set the red level to around 450mVp-p.

Press the **[Ctrl]** key and hold it down, then press the **U** and **D** keys so the red level is 450mV  $\pm$  20mVp-p.

(Fig. 3-21)

#### WHEN USING A VECTORSCOPE:

Press the **U** and **D** keys to set the red vector to around 160% of the burst.

Press the **[Ctrl]** key and hold it down, then press the **U** and **D** keys so the red vector is 160%  $\pm$  5%. (Fig. 3-22)

Press **[Enter]** key, and the display changes as follows.

```
<< ADJUSTMENT OF CHROMA GAIN >>
ADJUSTMENT FINISHED.
PRESS ANY KEY.
```

Press any key to return to ADJUSTMENT MENU.

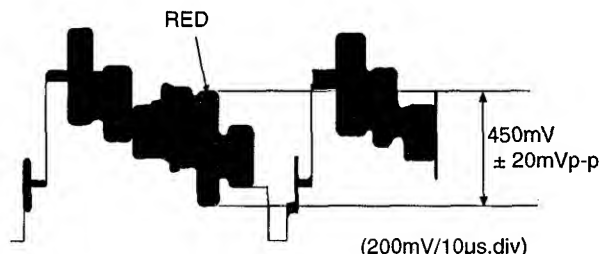


Fig. 3-21

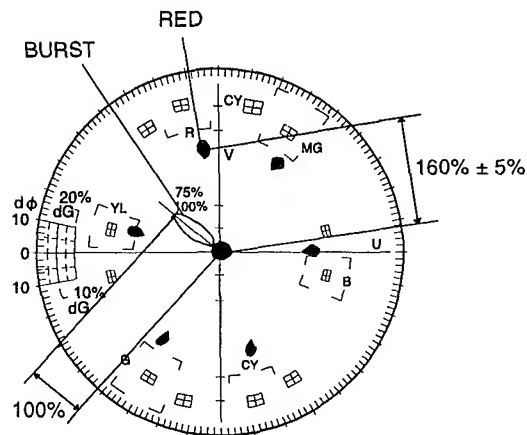


Fig. 3-22

```
<< ADJUSTMENT OF CHROMA GAIN >>
DATA WRITING EEPROM.
```

### 1.8.5 Autofocus Adjustment Procedure

**Note:** 1. Be sure to perform this adjustment after replacing or initializing the lens block, parts in the autofocus circuit and SPC circuit board (EEPROM).

2. When an error message appears during adjustment, refer to "Error Messages".

- 1) Start the MAP, referring to "1.8.1 How to Start the Adjustment Program (MAP)".
- 2) Press **D** to select AUTO FOCUS. (Figs. 3-23, 3-24, 3-25)
- 3) Select the number of the required adjustment.  
(If [ESC] (escape) is pressed, the computer's display returns to MAIN MENU).

**Note:** To complete adjustment, press the [ESC] (escape) twice to restore the MS-DOS screen and then turn off the camera/recorder and jig.

## MAIN MENU

\*\*\*\*\*

**MANUAL ADJUSTMENT PROGRAM**

\*\*\*\*\*

[A] DATA INITIALIZE

[B] ELECTRIC VOLUME

[C] ADJUSTMENT

[D] AUTO FOCUS

[E] SPOT NOISE

[ESC] END

**PRESS SELECT [A] - [E] OR [ESC]**

**Fig. 3-23**

Press **D** key.

Data loading now  
Please wait

**Fig. 3-24**

*AF ADJ. MENU*

```

*****
          AUTO FOCUS ADJUSTMENT
*****
[1]    ADJUSTMENT OF ZOOM/FOCUS TRACKING
[2]    ADJUSTMENT OF AF NOISE LEVEL
[ESC]  RETURN TO MENU
        PLEASE SELECT [1], [2] OR [ESC]

```

**Fig. 3-25**

### (1) Zoom/Focus Tracking Adjustment

<i>Purpose:</i>	To set the out-of-focus correction level during zooming.
<i>Incompleted phenomenon:</i>	Focus is lost during zooming.
<i>Test Point:</i>	Video out (AV OUT)
<i>Equipment:</i>	Color video monitor
<i>Condition:</i>	Point the camera at the backfocus chart, 1500 ± 5mm away from the lens surface. Light the chart with 200 - 400 lux.
<i>Procedure:</i>	

- Note:**
1. Measure the distance between the chart and lens surface precisely.
  2. Place the chart as parallel as possible to the lens surface.
  3. The backfocus chart should always be at the center of the monitor screen when the zoom is set to the wide-angle and telephoto ends.
  4. The zoom trace adjustment procedure is completed within 2 minutes after it is selected.
  5. Do not place any obstruction between the lens and chart during adjustment.

*AF ADJ. MENU*

\*\*\*\*\*  
**AUTO FOCUS ADJUSTMENT**  
 \*\*\*\*\*  
 [1] **ADJUSTMENT OF ZOOM/FOCUS TRACKING**  
 :

Press 1 key to select ADJUSTMENT OF ZOOM/FOCUS TRACKING.

## << ADJUSTMENT OF ZOOM/FOCUS TRACKING >>

0% 50% 100%

## << ADJUSTMENT OF ZOOM/FOCUS TRACKING >>

Response	Percentage
Yes	85%

Press any key to return to AF ADJ. MENU.

### 1.8.6 Spot Noise Adjustment Procedure

**Note:**

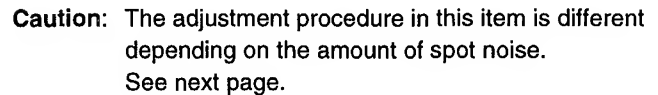
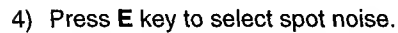
1. Spot noise refer to white, fine noise which rarely seen when lens is capped. This noise occurs due to pixel defect in the CCD.
2. Perform this adjustment only for products with which spot noise occurs. (However, there is no problem even if products free from spot noise are adjusted.)
3. After replacing the CCD image sensor or SPC circuit board (EEPROM), check whether or not spot noise occurs and then proceed with adjustment.
4. When an error message appears during adjustment, refer to "ERROR MESSAGES".

- 1) Start the MAP, referring to "1.8.1 How to Start the Adjustment Program (MAP)"  
(If [ESC] (escape) is pressed, the computer's display returns to MAIN MENU.)

**Note:** To complete adjustment, press the [ESC] (escape) key twice to restore the MS-DOS screen and then turn off the camera/recorder and jig.

2) Cap the lens.

3) Connect the color video monitor to video out.



E3 - 12

# MAIN MENU

```

*****
MANUAL ADJUSTMENT PROGRAM
*****
[E]  SPOT NOISE
:
:
    
```

Press E key .

```

SEARCHING SPOT NOISE NOW.
PLEASE WAIT A MOMENT.
    
```

Note: The amount of spot noise is display in place marked x.

One spot noise

Much spot noise

Spot noise is not detected (When camera/recorder free from spot noise are adjusted)

```

*****
SPOT NOISE COMPENSATE
*****
A SPOT NOISE FOUND.
PRESS ANY KEY.
    
```

```

*****
SPOT NOISE COMPENSATE
*****
x SPOT NOISE FOUND.
PRESS ANY KEY.
    
```

```

*****
SPOT NOISE COMPENSATE
*****
CANNOT FIND THE SPOT NOISE.
PRESS ANY KEY.
    
```

Press any key to return to MAIN MENU.

Press any key.

```

*****
SPOT NOISE COMPENSATE
*****
CAN YOU SEE THE BLINKING CURSOR ?(Y/N)
    
```

(A)

A cursor blinks in the section where spot noise occurs on the monitor screen.

YES

NO

Press Y Key.

Press N Key.

```

*****
SPOT NOISE COMPENSATE
*****
LOOK AT THE CURSOR POINT.
WHILE YOU CAN SEE THE SPOT NOISE,
PRESS SPACE KEY.
IF THE SPOT NOISE CLEARS,
THEN PRESS ENTER KEY.
    
```

```

*****
SPOT NOISE COMPENSATE
*****
THIS SPOT NOISE IS IN THE
BLANKING AREA OF TV.
PRESS ANY KEY.
    
```

Check whether or not spot noise disappears after auto adjustment is completed.

If it does not disappear: Press the space key.  
If it disappears: Press the enter key.

Press any key.

There are other occurrences of spot noise. (A)

Spot noise compensation is completed.

```

*****
SPOT NOISE COMPENSATE
*****
COMPLETE.
PRESS ANY KEY.
    
```

Press any key to Return to MAIN MENU.

## 1.8.7 Electronic Viewfinder (EVF) Adjustment Procedure

### (1) Deflection Yoke Position Adjustment (Fig. 3-51)

<i>Purpose:</i>	This adjustment procedure eliminates picture tilt in the EVF display.
<i>Equipment:</i>	EVF display
<i>Adjust:</i>	Deflection yoke
<i>Condition:</i>	Point the camera at the resolution chart.
<i>Procedure:</i>	

- 1) Loosen the deflection yoke nut.
- 2) Turn the deflection yoke so that the EVF picture (chart) is horizontal, matching the edges of the CRT.
- 3) After adjustment is completed, tighten the deflection yoke nut.

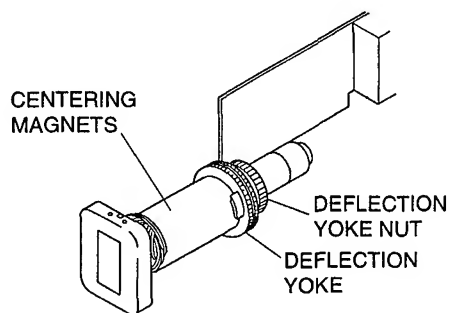


Fig. 3-51

### (2) EVF Centering Adjustment (Fig. 3-51)

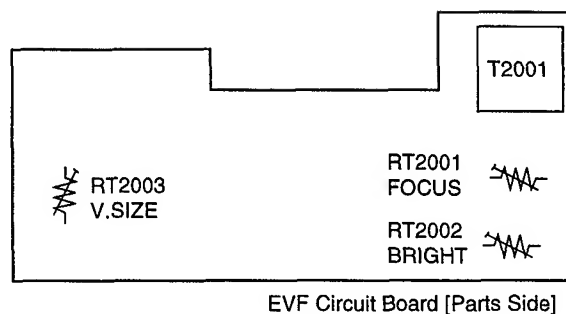
<i>Purpose:</i>	This adjustment center the image observed by the camera in the EVF.
<i>Equipment:</i>	EVF display
<i>Adjust:</i>	Centering magnets
<i>Condition:</i>	Point the camera at the resolution chart.
<i>Procedure:</i>	

- 1) Remove the locking paint from the centering magnet.
- 2) Adjust the centering magnets until the center of the picture viewed by the camera is positioned in the center of the EVF display.

### (3) EVF Vertical Size Adjustment (Fig. 3-52)

<i>Purpose:</i>	This adjustment determines the vertical size of the image appearing in the EVF display.
<i>Equipment:</i>	EVF display
<i>Adjust:</i>	RT2003 (V.SIZE) [on the EVF]
<i>Condition:</i>	Point the camera at the resolution chart.
<i>Procedure:</i>	

- 1) Adjust RT2003 so that the top and bottom edges of the chart match the top and bottom edges of the CRT screen.



EVF Circuit Board [Parts Side]

Fig. 3-52

### (4) EVF Brightness Adjustment (Fig. 3-52)

<i>Purpose:</i>	This adjustment sets the brightness of the picture in the EVF display.
<i>Equipment:</i>	EVF display
<i>Adjust:</i>	RT2002 (BRIGHT) [on the EVF]
<i>Condition:</i>	Point the camera at the resolution chart.
<i>Procedure:</i>	

- 1) Adjust RT2002 to optimize the EVF picture.

### (5) EVF Focus Adjustment (Fig. 3-52)

<i>Purpose:</i>	This control adjusts for optimum focus of the electronic viewfinder picture.
<i>Equipment:</i>	EVF display
<i>Adjust:</i>	RT2001 (FOCUS) [on the EVF]
<i>Condition:</i>	Point the camera at the resolution chart.
<i>Procedure:</i>	

- 1) Adjust RT2001 so that the EVF picture is clear.

## 2. VCR SECTION ADJUSTMENTS

### 2.1 CIRCUIT BOARD LOCATION

1. SPC (Sensor/Process) Circuit Board
2. TSS (Supply Sensor) Circuit Board
3. ERS (Take-up Sensor) Circuit Board
4. SWS (Main) Circuit Board
5. CON (Control) Circuit Board

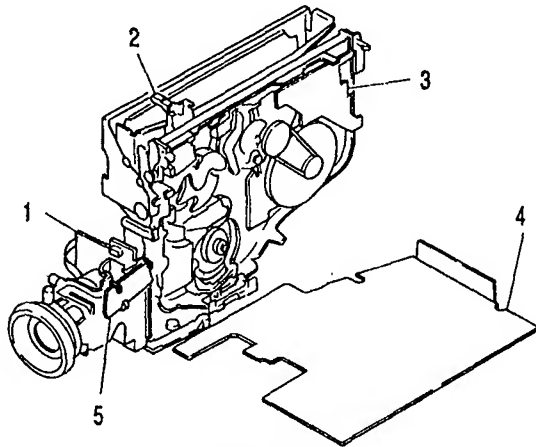


Fig. 3-101

### 2.5 CONNECTION FOR ADJUSTMENT

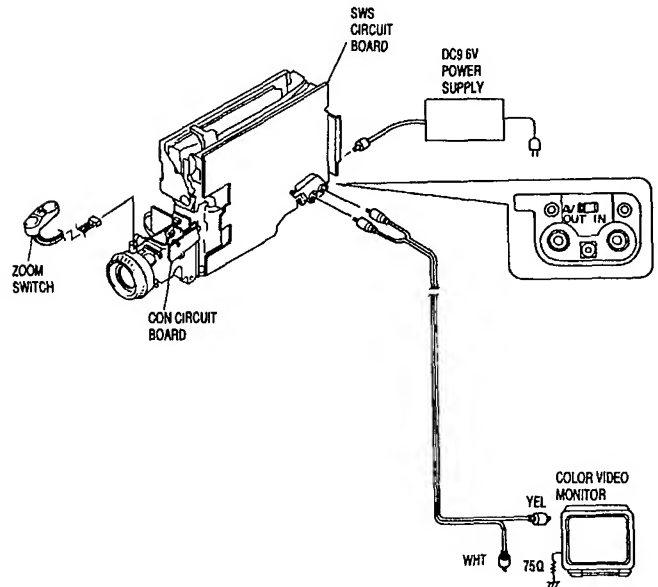


Fig. 3-102

### 2.2 TEST EQUIPMENT NECESSARY FOR ADJUSTMENT

#### Test Equipment

- Oscilloscope (dual trace)
- Color Video Monitor

#### Jigs, etc.

- Alignment Tape
- DC Power Supply (DC9.6V/3A)

### 2.3 ADJUSTMENT CONDITION

- 1) Check that the camera section has been adjusted correctly before adjusting the VCR section.
- 2) Connect this unit, a power supply and a color video monitor as shown in Fig. 3-102.
- 3) When using the video out (AV OUT) to perform adjustment, be sure to terminate the AV OUT jack with 75 ohms.
- 4) Use the 10:1 probe of the oscilloscope when otherwise not specified.

### 2.4 PRESET POSITIONS OF SWITCHES AND CONTROLS DURING ADJUSTMENT

- CAM/OFF/VIDEO switch ..... "VIDEO" position
- LIGHT switch ..... "OFF" position
- AV IN/OUT ..... "OUT" position

**Note:** The tracking is reset to the center each time the cassette ejected. (The zoom button operates as the tracking button during play.)



## 2.6 ADJUSTMENT COMPONENTS LOCATIONS

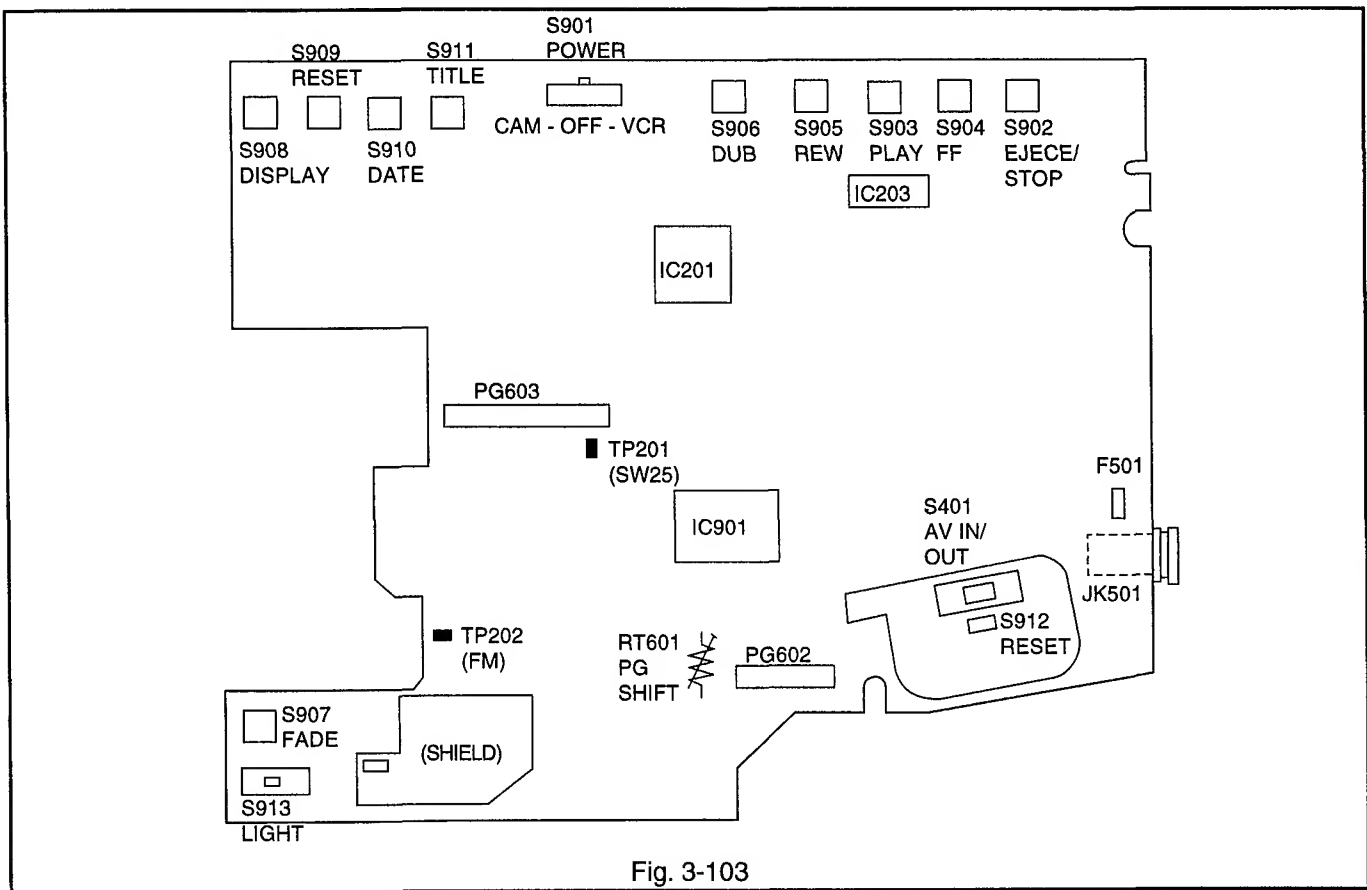


Fig. 3-103

## 2.7 ADJUSTMENT PROCEDURE

### 2.7.1 Servo Circuit Adjustment Procedure

#### (1) Head Switching Point Adjustment (Fig. 3-104)

**Note:** Be sure to perform this adjustment after replacing the cylinder assembly and main circuit board.

<i>Purpose:</i>	To set the switching point of the video heads during playback.
<i>Incompleted phenomenon:</i>	Vertical jitter occurs.
	Switching noise appears across the bottom of the monitor screen.
<i>Test Point:</i>	Video out (AV OUT) TP201 (SW25) [on the MAIN]
<i>Equipment:</i>	Oscilloscope Alignment tape
<i>Adjust:</i>	RT601 (PG SHIFT) [on the MAIN]
<i>Condition:</i>	Playback the alignment tape.
<i>Procedure:</i>	

- 1) Connect the oscilloscope to video out.
- 2) Connect the oscilloscope to TP201 (SW25).
- 3) Trigger the oscilloscope at SW25Hz.
- 4) Set the oscilloscope to the (-) slope.

- 5) Adjust that the trailing edge of the SW25Hz signal is  $6.5H \pm 0.5H$  (horizontal) line before the start of channel-1 vertical sync.
- 6) Set the oscilloscope to the (+) slope and confirm that the leading edge of the SW25Hz signal is  $6.5H \pm 0.5H$  (horizontal) line before the start of channel-2 vertical sync.

**Note:** The waveform of channel-1 and channel-2 video signals in the diagram may be opposite depending on the alignment tape.

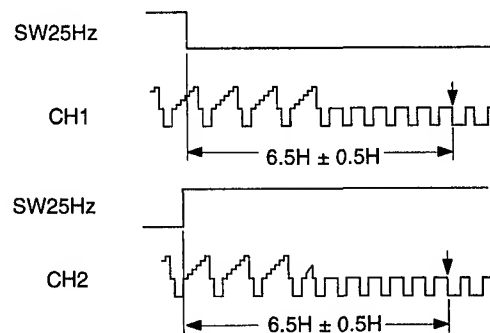


Fig. 3-104

## (2) X-Value Adjustment (Figs. 3-105, 3-106)

**Note:** The tracking is reset to the center each time the cassette ejected. (The zoom button operates as the tracking button during play.)

Be sure to perform this adjustment after replacing the cylinder assembly and audio control head.

<b>Purpose:</b>	To obtain compatibility with other VCRs.	
<b>Test Point:</b>	TP202 (FM)	[on the MAIN]
	TP201 (SW25)	[on the MAIN]
<b>Equipment:</b>	Oscilloscope Alignment tape	
<b>Adjust:</b>	X-Value Adjustment Nut	
<b>Condition:</b>	Playback the alignment tape.	
<b>Procedure:</b>		

- 1) Connect the oscilloscope to TP202 (FM).
  - 2) Connect the oscilloscope to TP201 (SW25).
  - 3) Trigger the oscilloscope at SW25Hz.
  - 4) Set the tracking control to center position.
  - 5) Playback the color bar signal on the alignment tape.
  - 6) Adjust the X-value adjustment nut so the signal at TP202 (FM envelope) is maximum.
- Press the two tracking control buttons (up and down) and check that the FM envelope becomes as shown in Fig. 3-106.

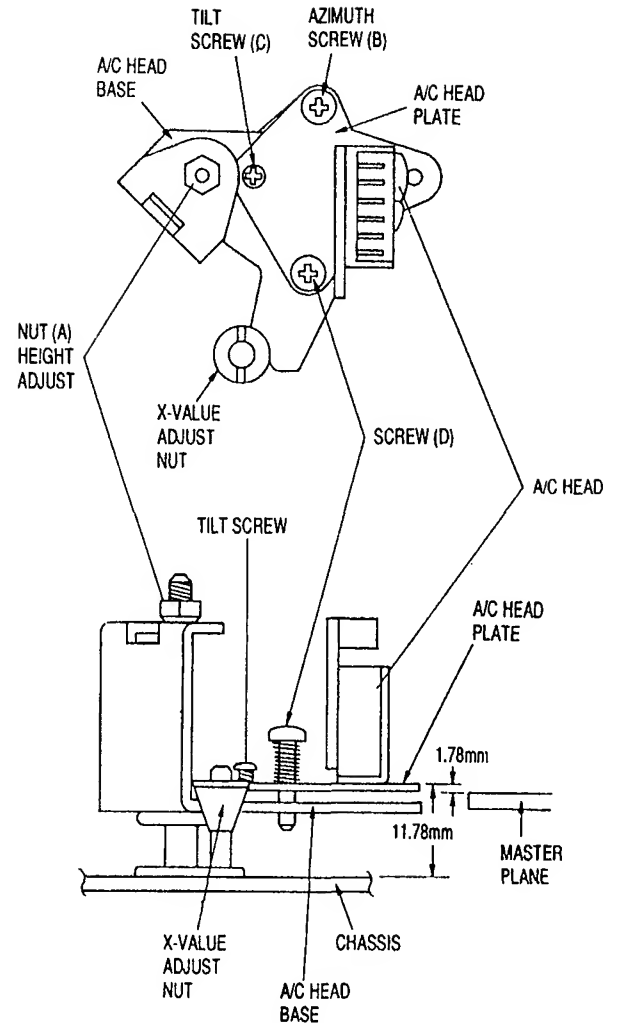


Fig. 3-105

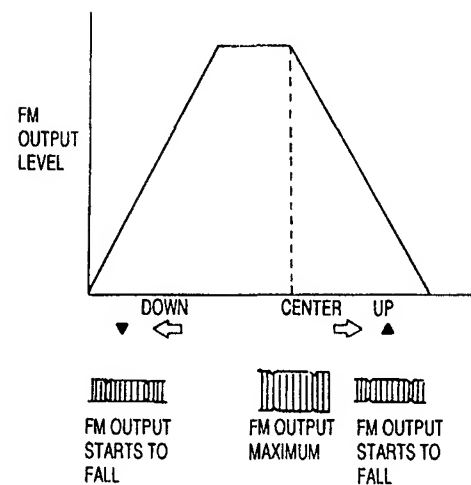


Fig. 3-106

### 3. ERROR MESSAGES

#### 3.1 ERROR MESSAGES IN CAMERA ELECTRIC VALUE AND DIGITAL ADJUSTMENTS

ERROR MESSAGE	COUNTERMEASURE
ERROR OCCURRED. IRIS TROUBLE PRESS ANY KEY	Check whether or not power is supplied. Check the values of the iris drive circuit. Defective soldering, damage to pattern, etc. in the above circuit. Check the iris block and replace it if necessary.
ERROR OCCURRED ON da ADJUSTMENT PRESS ANY KEY	Check the values in the hall amp circuit. Defective soldering, damage to pattern, etc. in the above circuit.
D RANGE OVER. ERROR ON da ADJUSTMENT PRESS ANY KEY	Check the values in the hall amp circuit. Defective soldering, damage to pattern, etc. in the above circuit.
ERROR OCCURRED ON da0 and da1 ADJUSTMENT PRESS ANY KEY	Check the values in the hall amp circuit and its peripheral circuits. Defective soldering, damage to pattern, etc. in the above circuits.
FILE NOT FOUND !!!! PRESS ANY KEY	The adjustment program (file) cannot be found. Check the adjustment floppy disk and replace it if necessary.
FILE OPEN ERROR !!!! PRESS ANY KEY	The adjustment program (file) does not start. Check the adjustment floppy disk and replace it if necessary.
ERROR OCCURRED ON C DUTY ADJUSTMENT PRESS ANY KEY	Check the values of the iris drive circuit. Defective soldering, damage to pattern, etc. in the above circuit.
ERROR OCCURRED ON FDET ADJUSTMENT PRESS ANY KEY	Supply power again and re-adjust. Check the values in the hall amp circuit. Defective soldering, damage to pattern, etc. in the above circuit.
ERROR OCCURRED. ZOOM DOES NOT WORK PRESS ANY KEY	Supply power again and re-adjust.
TOO BRIGHT PRESS ANY KEY	The subject is too bright. Move the camera further away from the light box.
TOO DARK PRESS ANY KEY	The subject is too dark. Check the light box. Move the camera closer to the light box.
D RANGE OVER ERROR ON HALL AMP IRIS CANNOT OPEN ANY MORE PRESS ANY KEY	Supply power again and re-adjust. The subject is too dark. Check the light box. Move the camera closer to the light box. Check the values in the hall amp circuit. Defective soldering, damage to pattern, etc. in the above circuit.
STAURATION ERROR. TOO BRIGHT PRESS ANY KEY	The subject is too bright. Move the camera further away from the light box.
CAN'T ADJUSTMENT WHITE BALANCE PLEASE RETRY PRESS ANY KEY	The subject is too bright or too dark. Check the light box. Move the camera closer to or away from the light box. Supply power again and re-adjust.

#### 3.2 ERROR MESSAGES IN AUTOFOCUS ADJUSTMENT

ERROR MESSAGE	COUNTERMEASURE
TIME OUT ERROR ON FOCUS	Check the conditions of subject. If this error message appears even when the adjustment is performed 2 or 3 times, the autofocus circuit system is defective. Refer to (1) of TROUBLESHOOTING OF AUTOFOCUS.
TIME OUT ERROR ON ZOOM	If this error message appears even when the adjustment is performed 2 or 3 times, the autofocus circuit system is defective. Refer to (2) of TROUBLESHOOTING OF AUTOFOCUS.
TIME OUT ERROR ON AF STEP	Check the conditions of subject. If this error message appears even when the adjustment is performed 2 or 3 times, the autofocus circuit system is defective. Refer to (1) of TROUBLESHOOTING OF AUTOFOCUS.

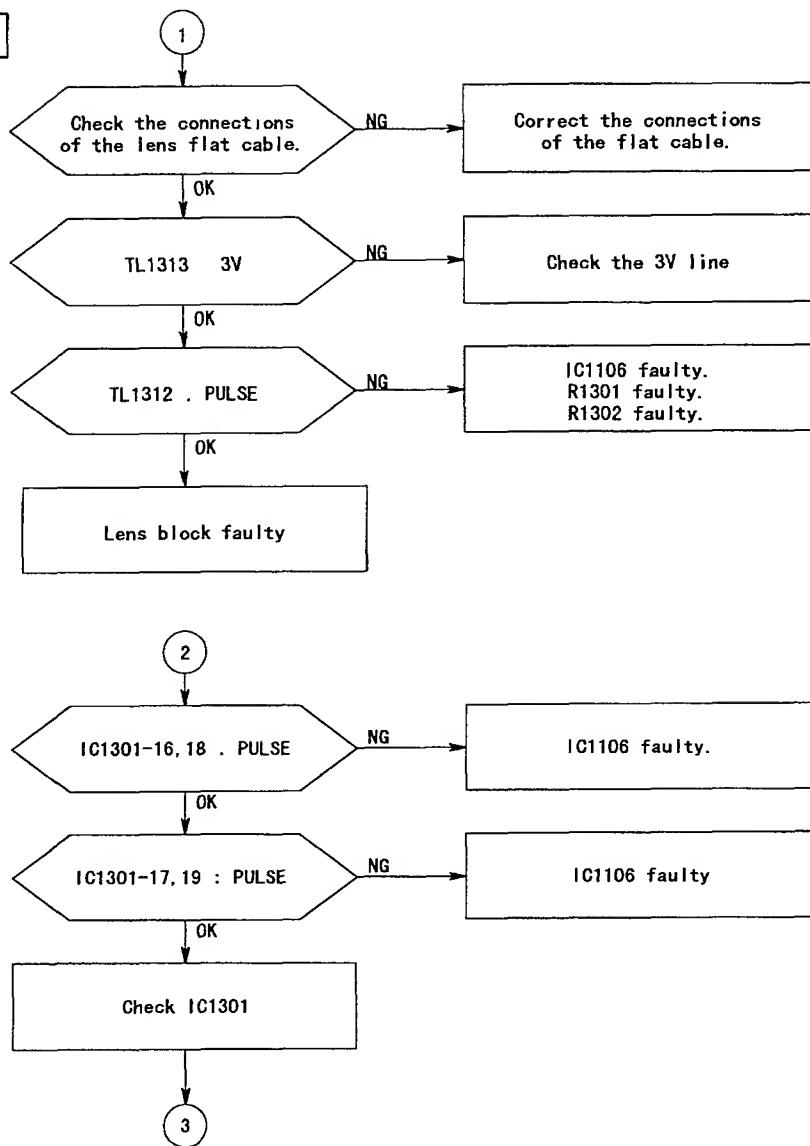
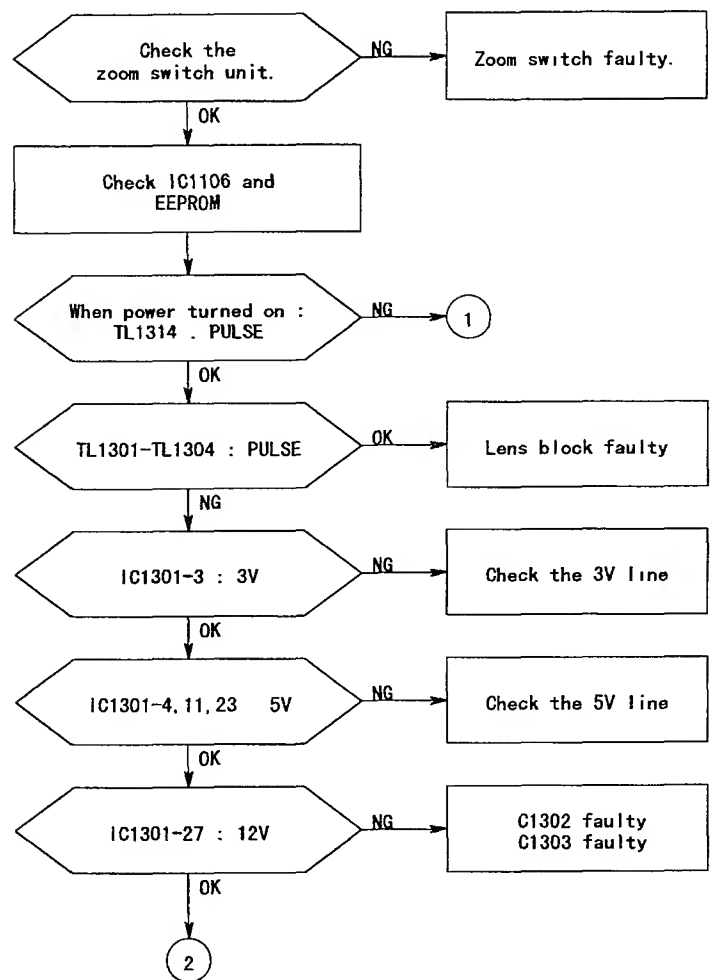
<i>ERROR MESSAGE</i>	<i>COUNTERMEASURE</i>
AF LIMIT OVER	Check the conditions of subject. If this error message appears even when the adjustment is performed 2 or 3 times, the autofocus circuit system is defective. Refer to (2) of TROUBLESHOOTING OF AUTOFOCUS.
AF ERROR	If this error message appears even when the adjustment is performed 2 or 3 times, the autofocus circuit system is defective. Refer to (1) of TROUBLESHOOTING OF AUTOFOCUS.
TOO DARK	Insufficient lighting. Check the subject.

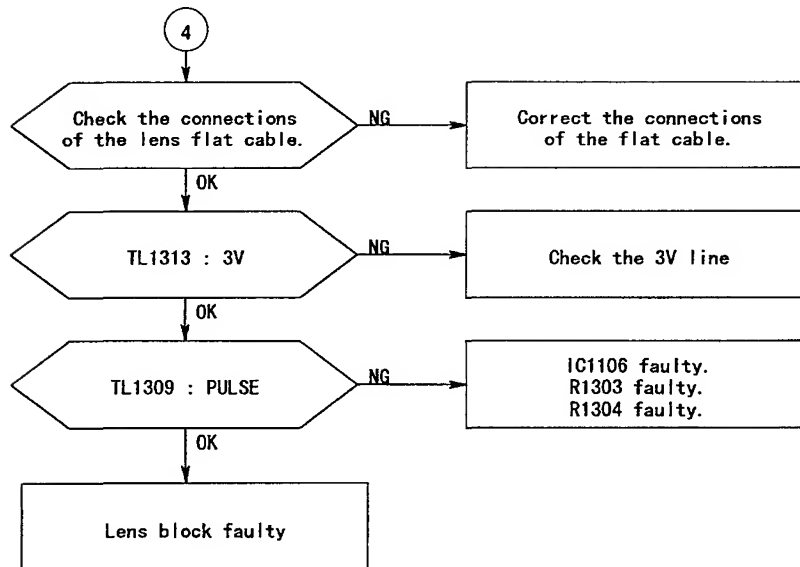
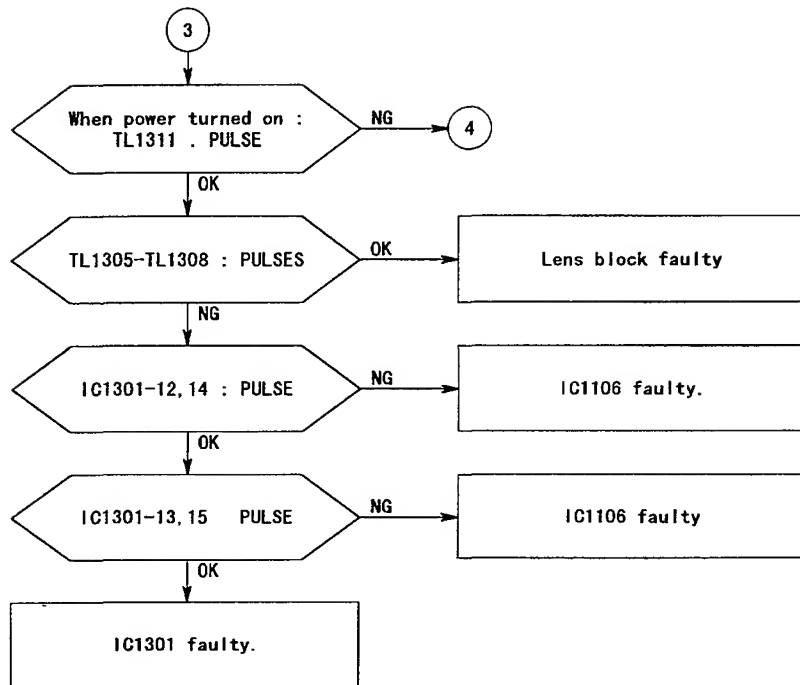
### 3.3 ERROR MESSAGES IN SPOT NOISE ADJUSTMENT

<i>ERROR MESSAGE</i>	<i>COUNTERMEASURE</i>
ERROR! ! SPOT NOISE COMPENSATION IS STOPPED BY INITIAL DATA. PLEASE CHECK THE EEPROM. PRESS ANY KEY.	Spot noise compensation is inhibited by the data in the EEPROM. Turn the power on again. Data in the EEPROM is defective. (Initialize it.) Check the EEPROM, and if necessary, replace it.
ERROR! ! THRESHOLD DATA ERROR. PLEASE CHECK THE EEPROM. PRESS ANY KEY.	Turn the power on again. Data in the EEPROM is defective. (Initialize it.) Check the EEPROM, and if necessary, replace it.
ERROR! ! THE SPOT NOISE IS TOO MANY. CAN NOT COMPENSATE ANY MORE. PRESS ANY KEY.	The amount of spot noise that can be compensated reaches the limit. Turn the power on again. Check the CCD image sensor, and if necessary, replace it.

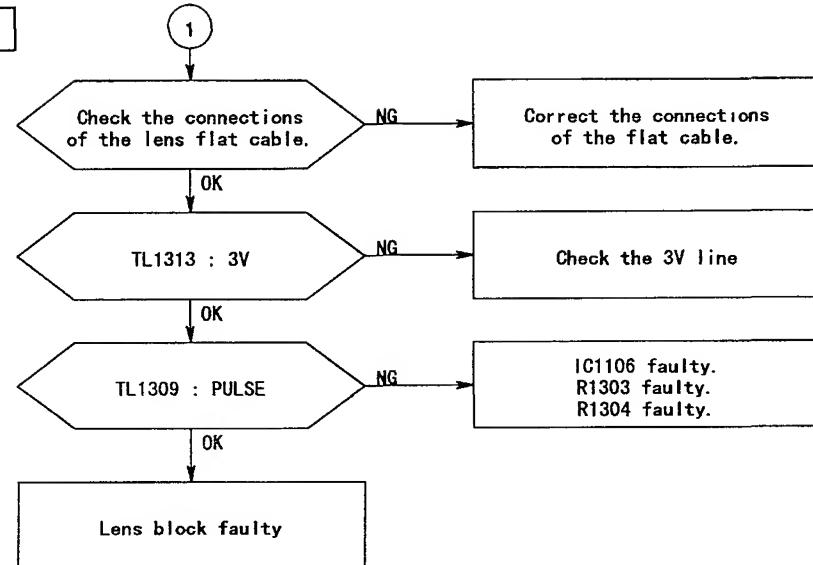
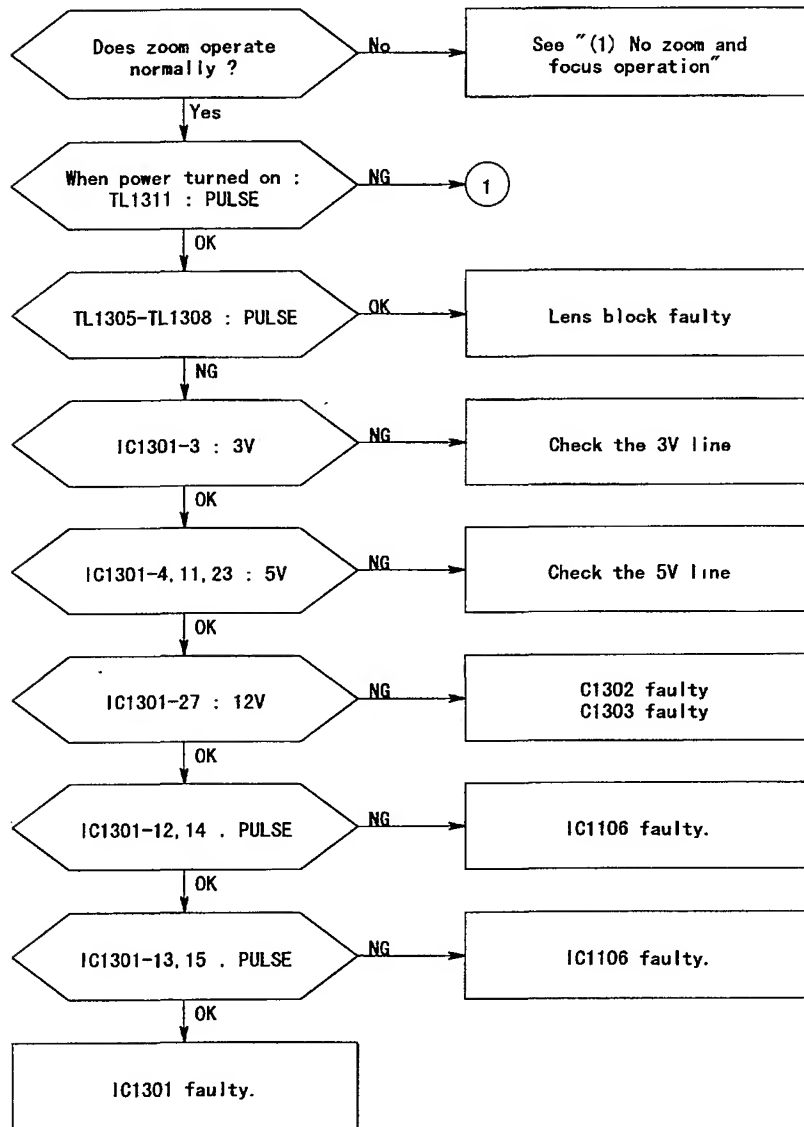
#### 4. TROUBLE SHOOTING OF AUTOFOCUS

##### (1) NO ZOOM AND FOCUS OPERATION

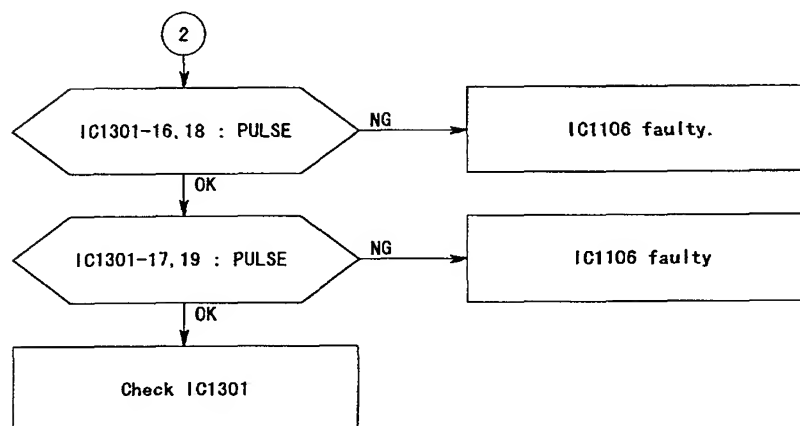
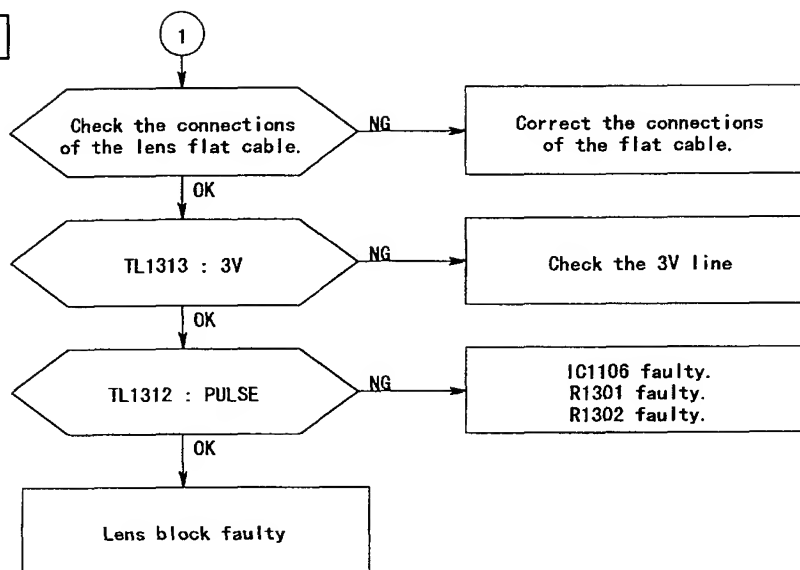
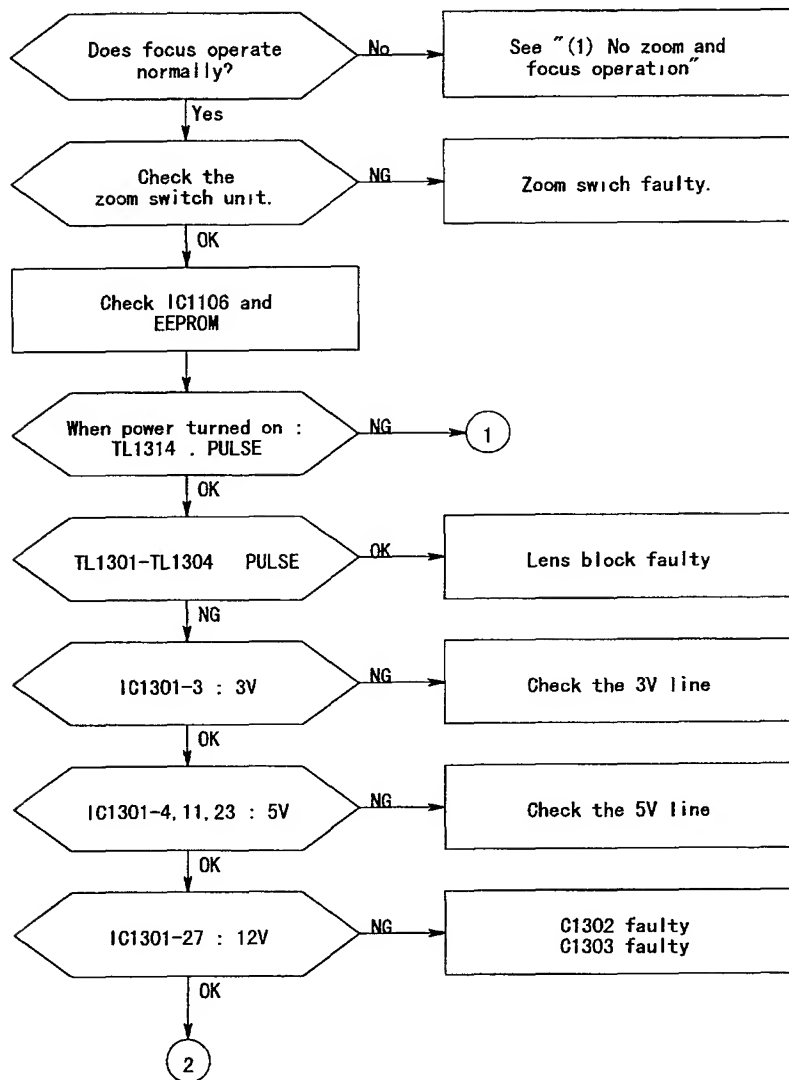




## (2) NO FOCUS LENS OPERATION

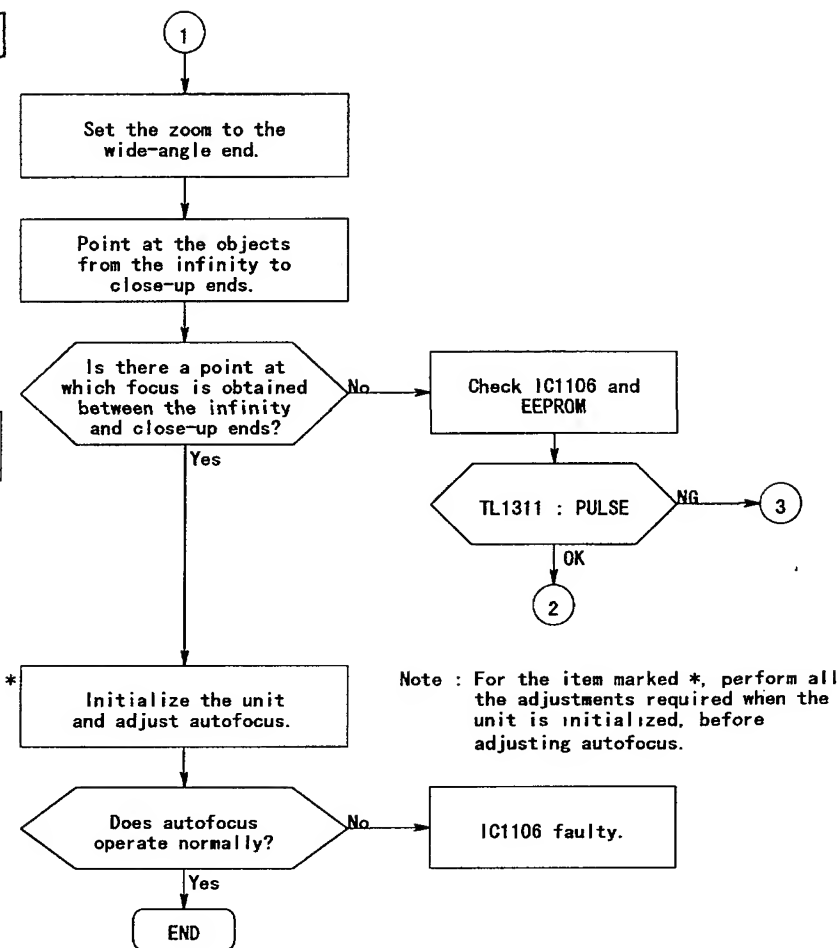
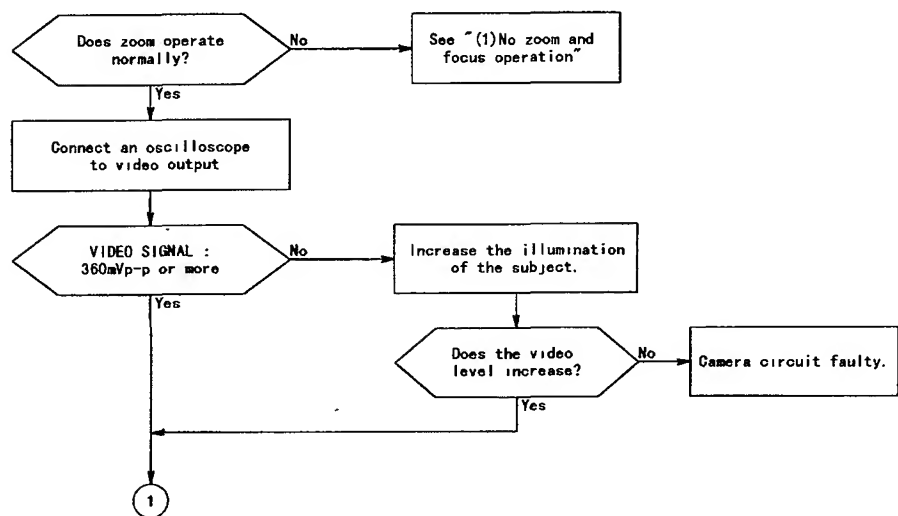


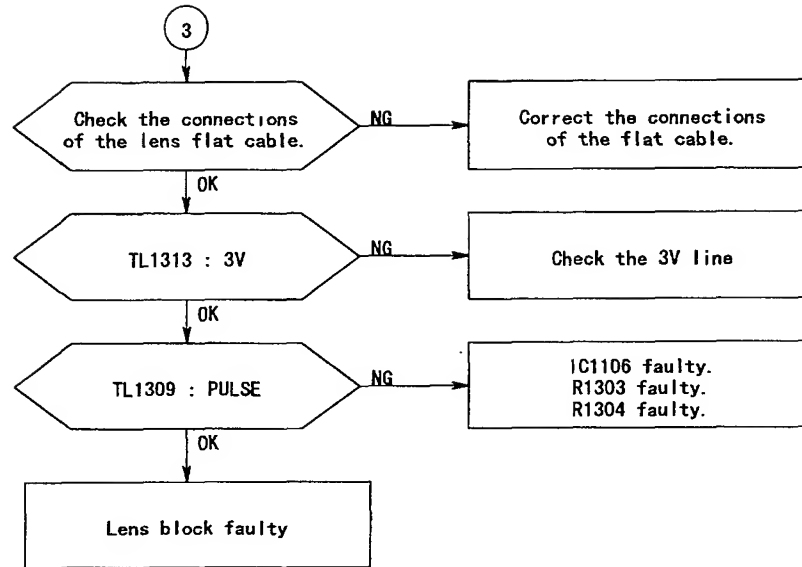
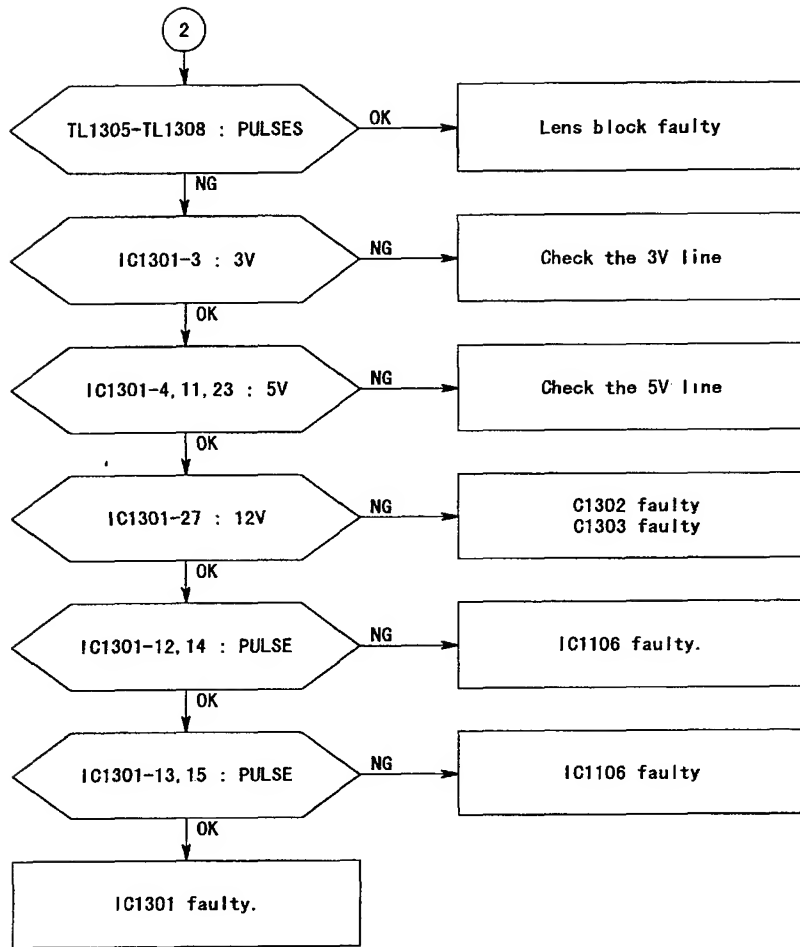
### (3) NO ZOOM OPERATION



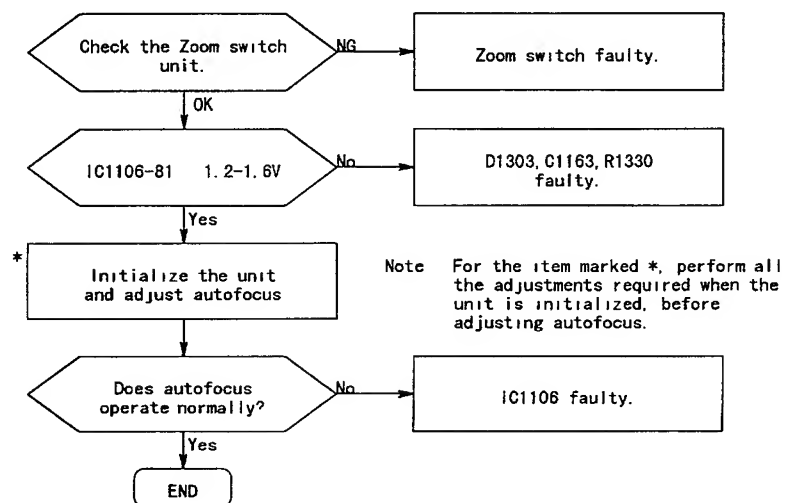


## (4) NO AUTOFOCUS OPERATION

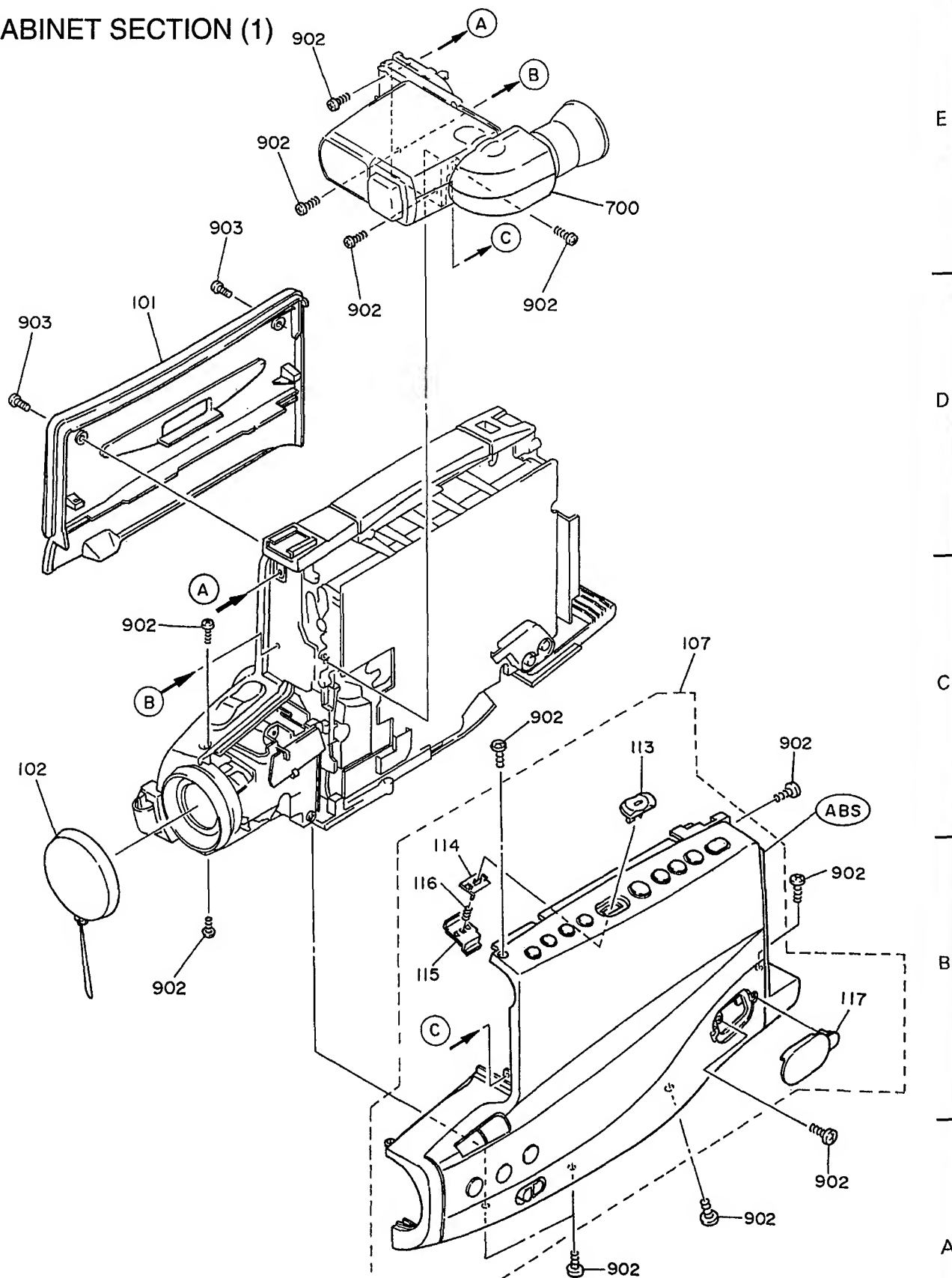




## (5) SUBJECT IS GREATLY OUT-OF-FOCUS WHEN ZOOMED.

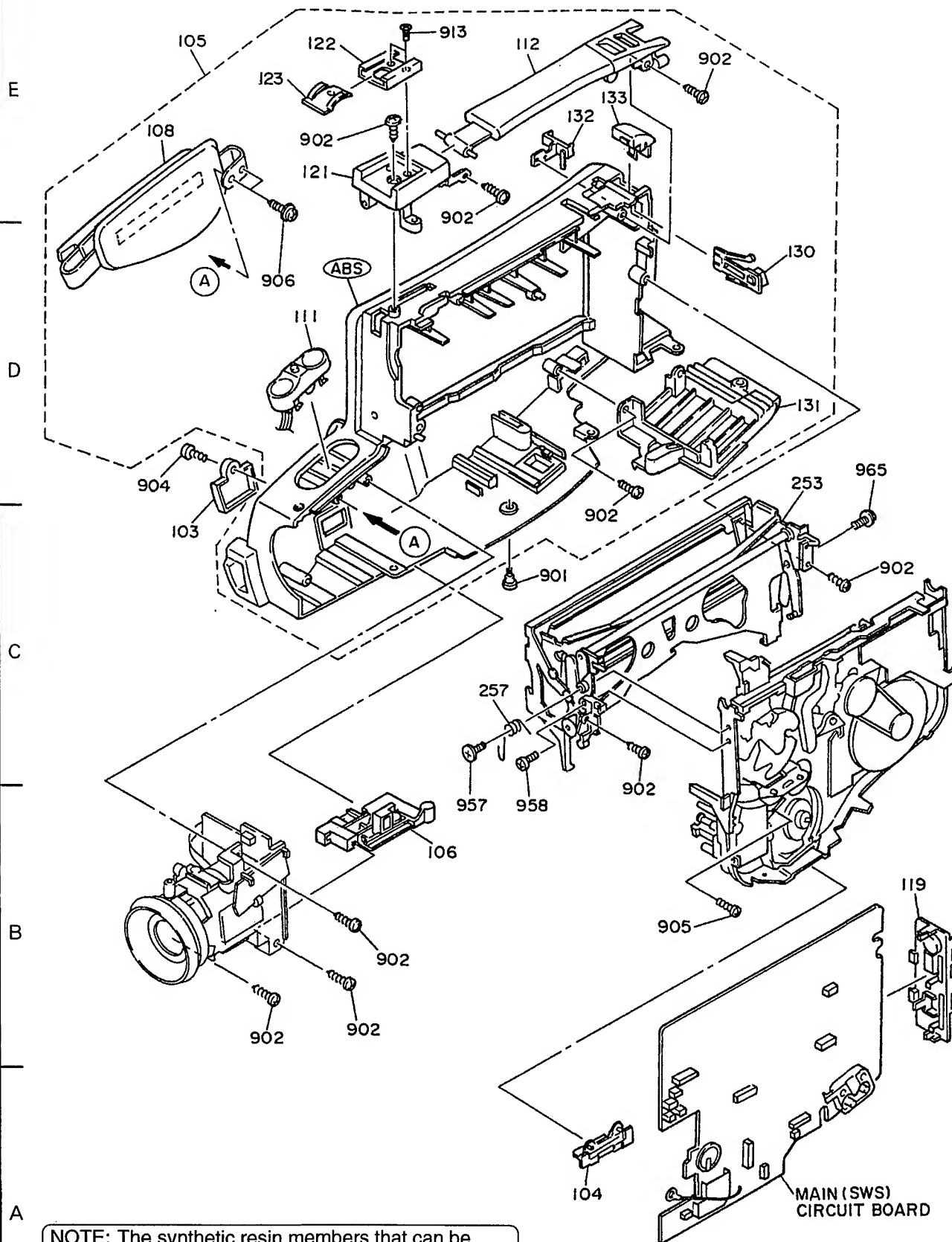


## 1. CABINET SECTION (1)



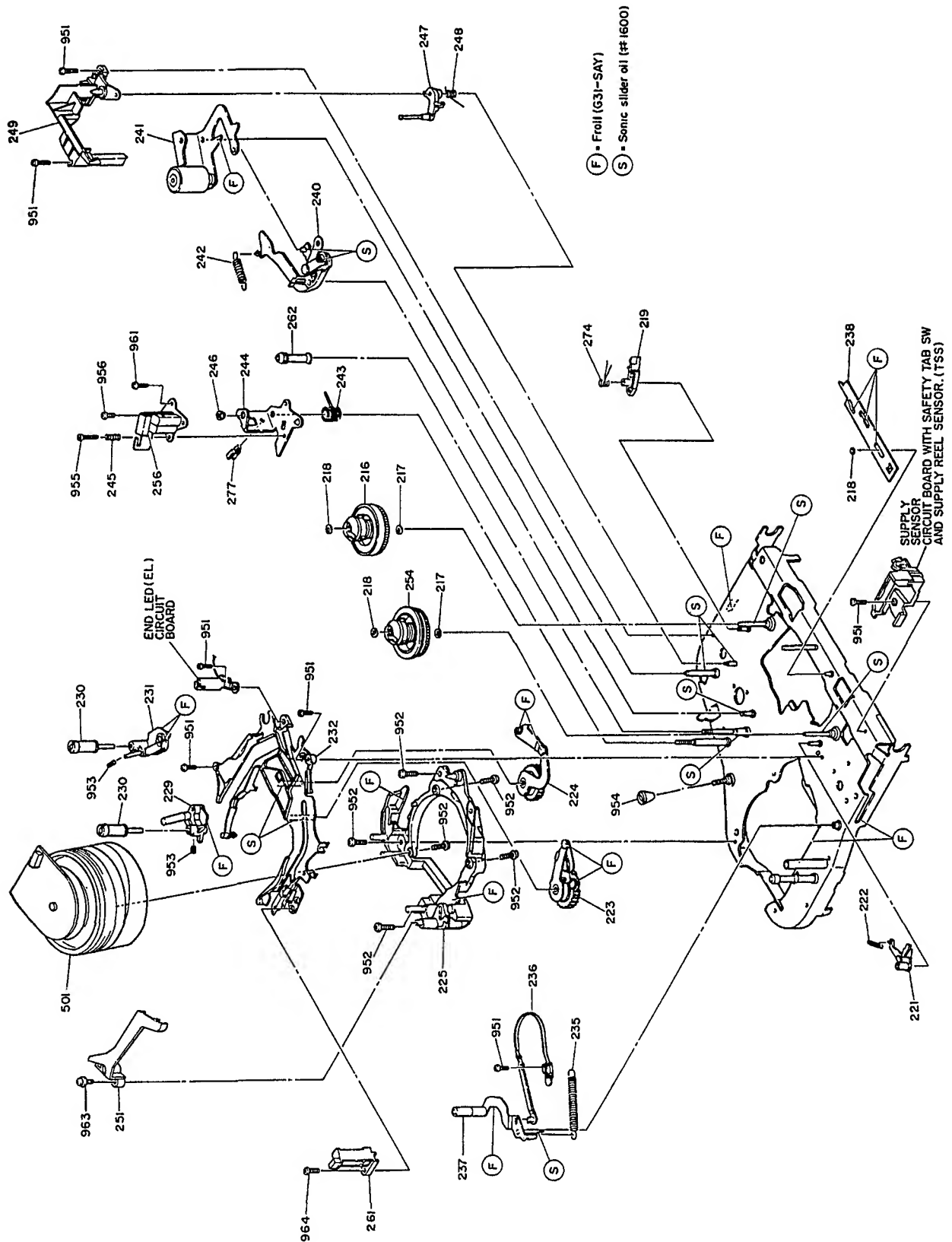
NOTE: The synthetic resin members that can be dismantled are shown by abbreviations using letters.

## 2. CABINET SECTION (2)



**NOTE:** The synthetic resin members that can be dismantled are shown by abbreviations using letters.

### 3. CHASSIS (TOP VIEW) SECTION



F

D

C

B

A

1

2

3

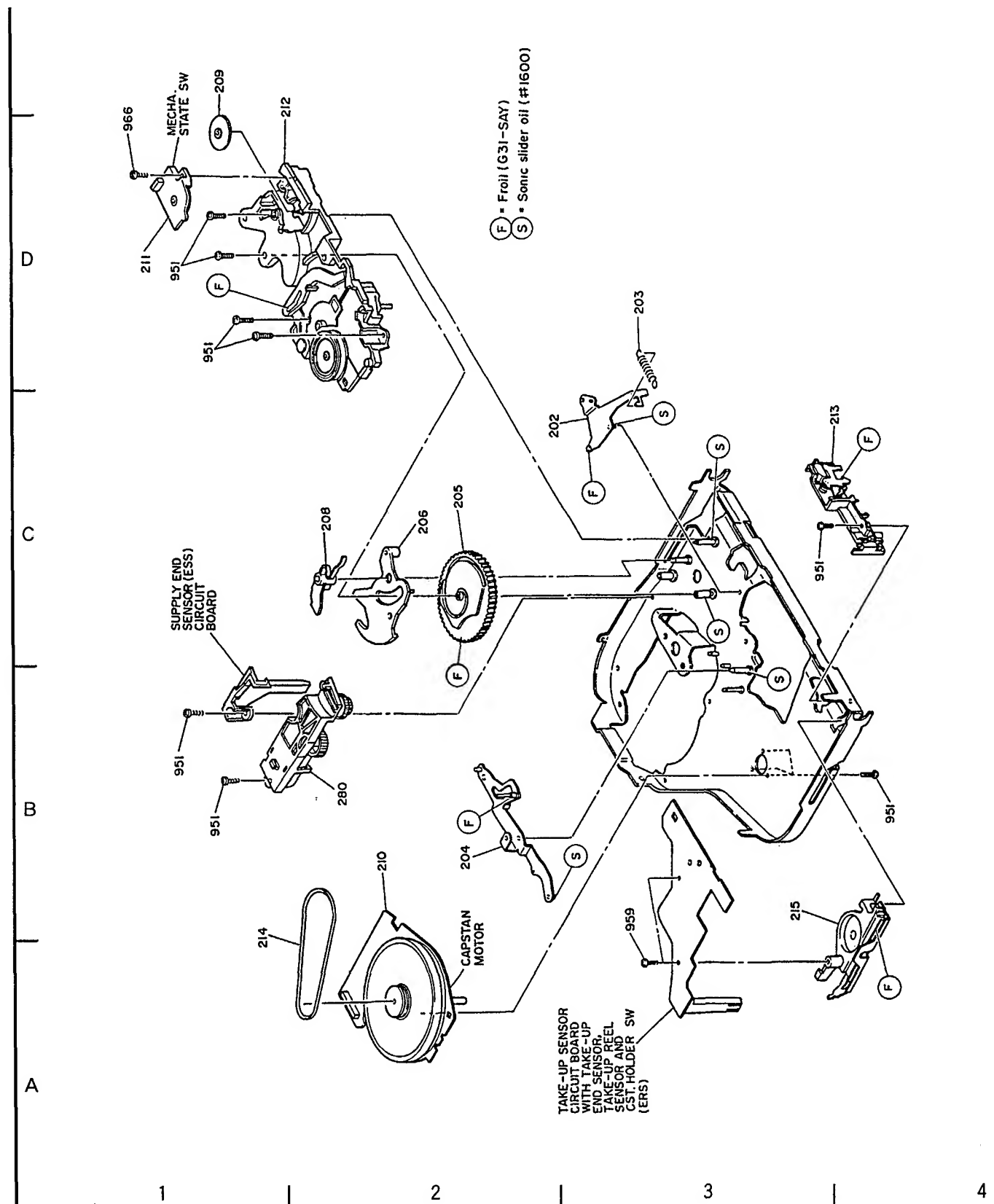
4

## 4. CHASSIS (BOTTOM) SECTION

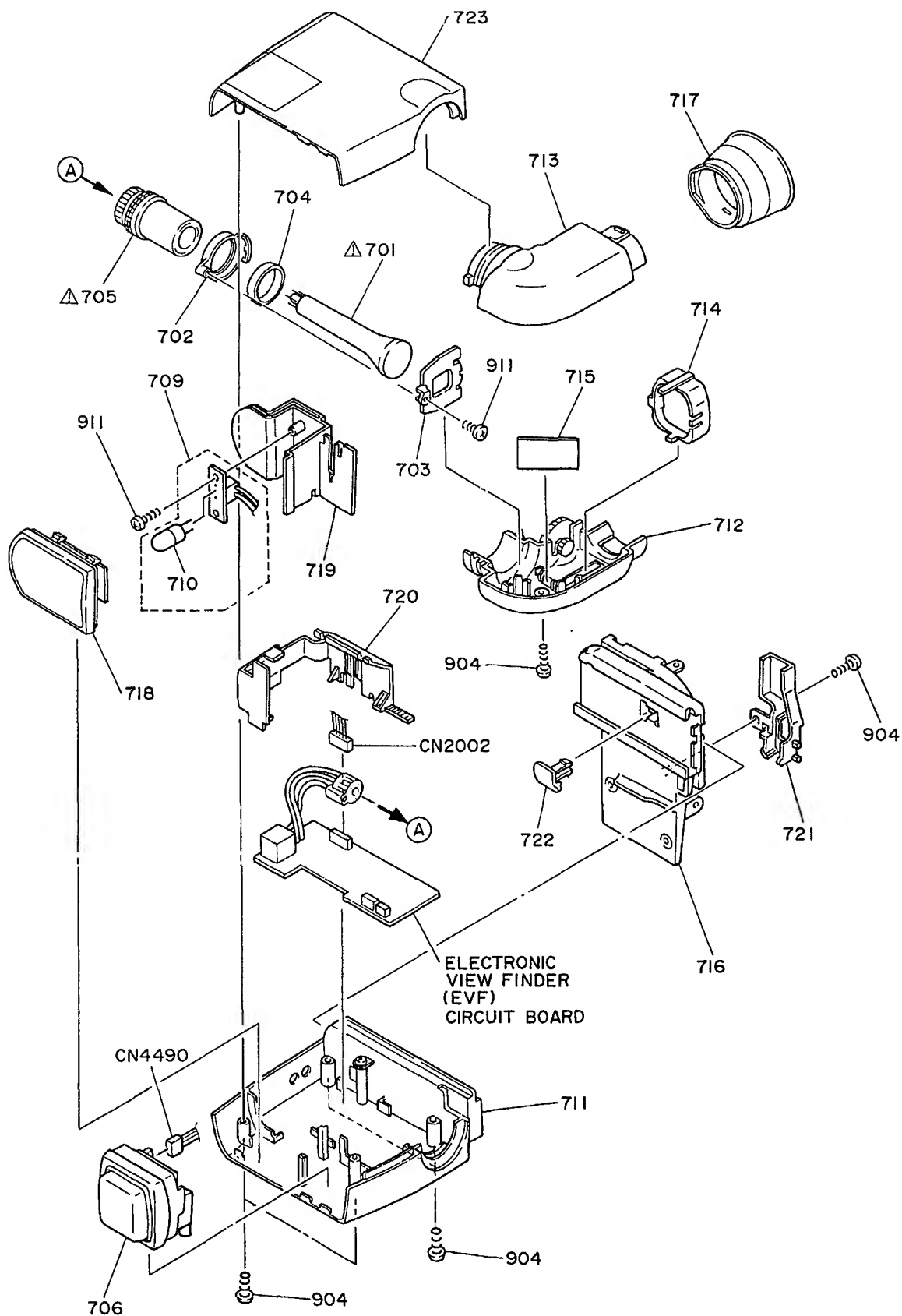
### LUBRICATION

Lubrication points are shown in the exploded view diagrams by marks (F), (S).  
Lubrication shown in the diagrams are as follows.

- (F) : Froil (G31-SAY)
- (S) : Sonic slider oil (#1600)

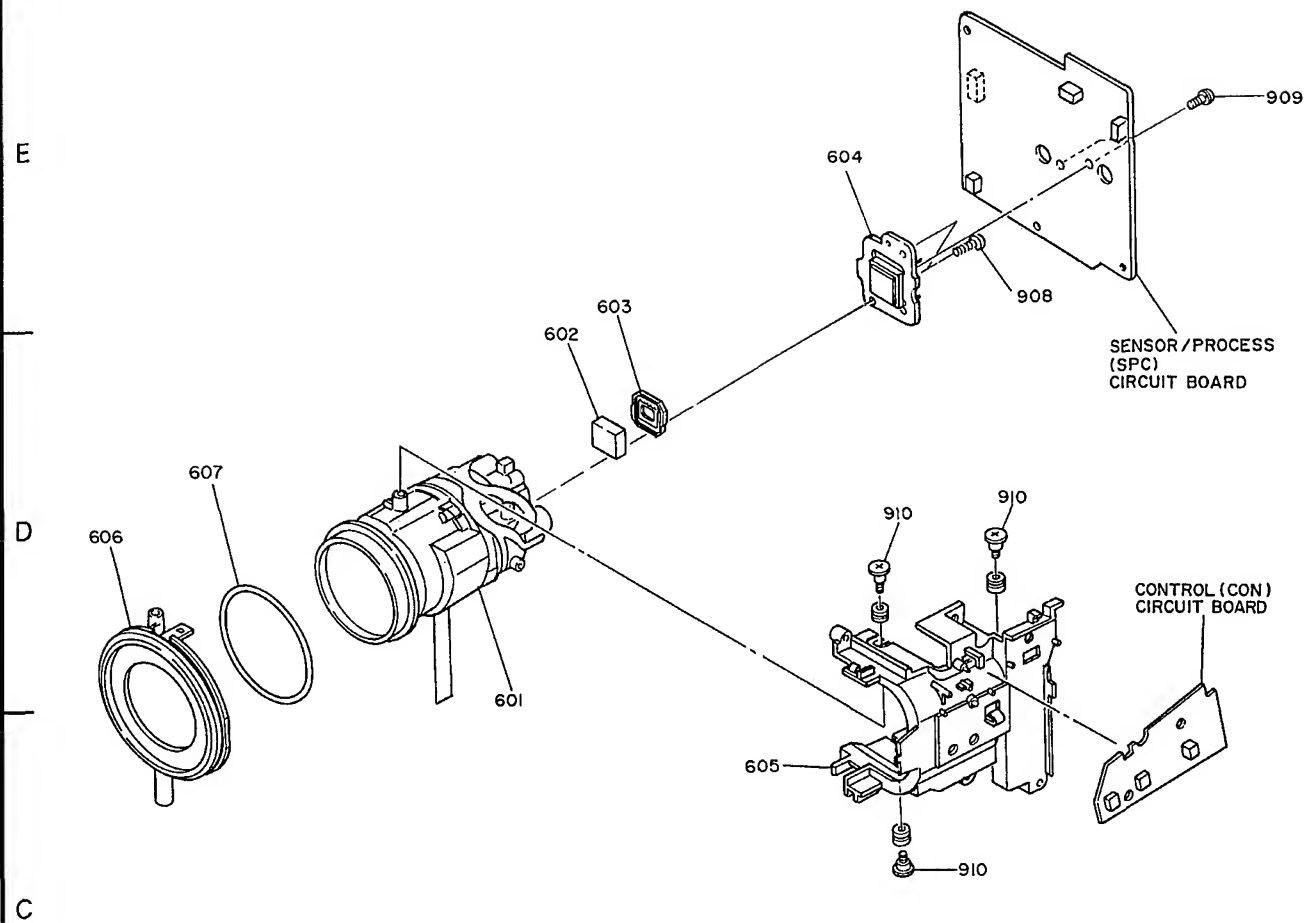


## 5. ELECTRONIC VIEWFINDER (EVF) SECTION

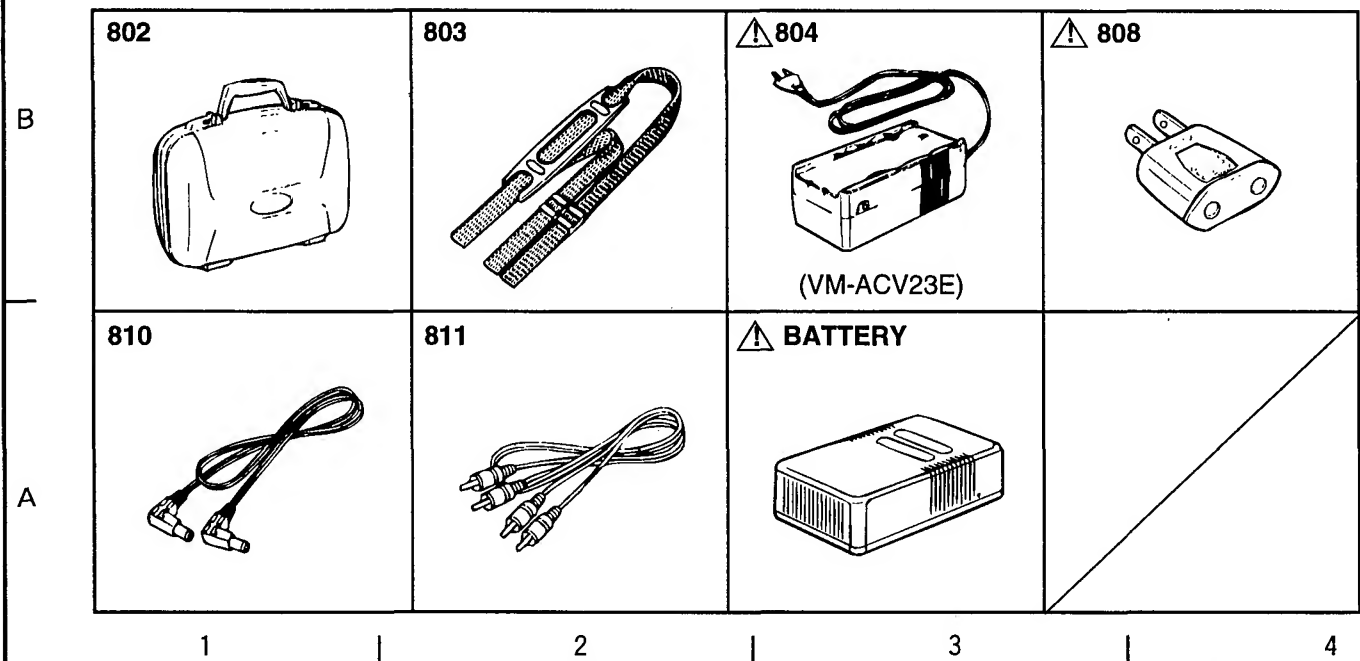




## 6. CAMERA SECTION



## 7. ACCESSORIES



# CHAPTER 5 REPLACEMENT PARTS LIST

## 1. MECHANICAL PARTS LIST

SYMBOL NO	P-NO	DESCRIPTION	SYMBOL NO	P-NO	DESCRIPTION
MECHANISM SECTION			249	6806257	PLATE
101	PH14894	LID, CASSETTE	251	KX15291	GUIDE
102	QX12051	CAP, HOOD	253	KX10417	CASSETTE HOLDER ASSY
103	QD13712	COVER, ADJUSTMENT	254	KH10114	REEL, SUPPLY
104	6409331	HINGE, CBA	256	5443492	HEAD, AUDIO CONTROL
105	QD14723	CASE, SIDE (R)	257	6550942	SPRING
106	NT10521	PIECE, TRIPOD	261	GC10111	FE HEAD
107	QD14733	CASE, SIDE (L)	262	4508238	GUIDE
108	QX12751	STRAP, HAND	274	6552494	SPRING
111	FH10241	SWITCH	277	KX16791	CLAMP
112	PV10201	HANDLE ASSY	280	KX10941	LOADING BLOCK
113	PC12162	KNOB, POWER	501	HX10472	CYLINDER ASSY (CY-V3SA)
114	PC12241	SLIDE, POWER	601	K010521	LENS, ZOOM
115	PC12171	HOLDER, POWER KNOB	602	DT10141	CRYSTAL
116	6305733	SPRING	603	NX11252	RUBBER
117	PH13691	COVER, JACK	604	UE12322	CCD IMAGE SENSOR ASSY
119	QX12036	TERMINAL	605	NT10791	FRAME, LENS
121	QX12001	HOLDER, HANDLE	606	QX12651	HOOD
122	7796453	SHOE, ACCESSARY	607	NX11243	RING, O
123	KL11081	SPRING, SHOUL	△700	UE12034	EVF ASSY
130	QX11951	LEVER, LOCK	△701	5319051	CRT (M01KOM07WB)
131	QD13602	HOLDER, PAD	702	6409361	CRT HOLDER
132	QX11961	HOLDER, LEVER	703	4731871	COVER CRT
133	PC12112	BUTTON, EJECT	704	6594361	RUBBER
202	KX12711	ARM, LOCK	△705	5242111	DEFLECTION YOKE
203	6555792	SPRING	706	GH10111	MICROPHONE
204	7469922	ARM, CAM	709	DP10111	LAMP
205	6440164	GEAR	710	DP10122	BULB
206	6916112	GEAR, LOADING	711	QD12368	CASE, BOTTOM (U)
208	6805682	ARM, OPERATION	712	4717952	NECK, BOTTOM
209	KF10431	GEAR	713	4717941	NECK UPPER
210	GP10216	MOTOR, CAPSTAN	714	6952291	LENS ASSY
211	5610821	SWITCH	715	4895942	MIRROR
212	KX10993	LOADING BLOCK	716	QD13521	COVER, FRONT
213	KX14721	HOLDER	717	4799871	CAP EYE
214	KK10111	BELT	718	4717982	COVER, LIGHT
215	KX15231	BASE, SLIDER	719	NT10341	FRAME
216	KH10133	TAKE UP REEL	720	6409374	HOLDER, CORD
217	7786623	POLYSLIDER WASHER	721	NX13781	GUIDE, CORD
218	7778859	POLYSLIDER WASHER	722	NJ10181	COVER, SHOE
219	6820551	BRAKE	723	4717891	CASE, UPPER
221	6806322	BRAKE, SUB	901	7784373	SCREW
222	6555814	SPRING	902	8699308	SCREW (2.6X8) BLACK
223	KX14651	GEAR, LOADING (I)	903	7784785	SCREW
224	KX14681	GEAR, LOADING (O)	904	8699106	SCREW (2X6)
225	6916148	BASE, CYLINDER	905	8652405	SCREW 3X5 WITH WASHER
229	6916343	BASE, GUIDE ROLLER (IN)	906	MJ10301	SCREW
230	6424743	ROLLER, GUIDE	908	7775945	SCREW (2X5)
231	6916364	BASE, GUIDE ROLLER (OUT)	909	8650103	SCREW (2X3)
232	KX10241	PLATE	910	MJ10221	SCREW
235	6555823	SPRING	911	8691106	SCREW (2X6)
236	6820992	BAND, TENTION	913	8639106	SCREW (2X6)
237	7472875	ARM, TENTION	951	8741106	SCREW (2X6)
238	KX14711	SLIDER	952	8741408	SCREW (B3X8)
240	7469943	LINK, PRESSER ROLLER	953	7782616	SCREW
241	7469909	ARM, PRESSURE ROLLER	954	6911101	SCREW
242	6523243	SPRING	955	8741110	BIND SCREW-2MMDX 10MM
243	6551952	SPRING	956	MJ10111	SCREW
244	NA11981	ARM, HEAD	957	7770831	SCREW
245	6523253	SPRING	958	7784371	SCREW
246	7785673	NUT	959	8691106	SCREW (2X6)
247	6911698	ARM	961	8741104	SCREW (2X4)
248	6551961	SPRING	963	MK11051	SCREW (2X5)
			964	MJ10211	SCREW
			965	7773911	WASHER

SYMBOL NO	P-NO	DESCRIPTION	SYMBOL NO	P-NO	DESCRIPTION
966	8691108	SCREW (2X8)			
		ACCESSORIES			
802	TS12793	CASE, CARRING			
803	PX10202	STRAP, SHOULDER			
△ 804	TS12519	AC ADAPTOR (VM-ACV23E)			
△ 808	5699421	SOCKET			
810	EV10422	CORD, POWER			
811	EW10944	CORD			

## 2. ELECTRICAL PARTS LIST

SYMBOL NO	P-NO	DESCRIPTION	SYMBOL NO	P-NO	DESCRIPTION
VCR SECTION					
C0201	0893018	CERAMIC CHIP 0.022UF+10% 25V	C0274	0209937	CERAMIC CHIP 39PF+5% 50V
C0202	0893018	CERAMIC CHIP 0.022UF+10% 25V	C0276	0209936	CERAMIC CHIP 33PF+5% 50V
C0203	0893027	CERAMIC CHIP 0.1UF+10% 25V	C0277	0209935	CERAMIC CHIP 27PF+5% 50V
C0204	0893014	CERAMIC CHIP 0.01UF+10% 25V	C0278	0207525	ELECTROLYTIC 1UF 50V
C0205	0893027	CERAMIC CHIP 0.1UF+10% 25V	C0280	0800211	ELECTROLYTIC 0.1UF 50V
C0206	0893014	CERAMIC CHIP 0.01UF+10% 25V	C0281	0893018	CERAMIC CHIP 0.022UF+10% 25V
C0207	0893031	CERAMIC CHIP 1000PF+10% 50V	C0282	0893018	CERAMIC CHIP 0.022UF+10% 25V
C0209	0893014	CERAMIC CHIP 0.01UF+10% 25V	C0283	0893027	CERAMIC CHIP 0.1UF+10% 25V
C0210	0209945	CERAMIC DISC 180PF+5% 50V	C0284	0800231	ELECTROLYTIC 100UF 6.3V
C0211	0893014	CERAMIC CHIP 0.01UF+10% 25V	C0285	0800231	ELECTROLYTIC 100UF 6.3V
C0212	0893014	CERAMIC CHIP 0.01UF+10% 25V	C0286	0800219	ELECTROLYTIC 10UF 16V
C0213	0893014	CERAMIC CHIP 0.01UF+10% 25V	C0287	0800227	ELECTROLYTIC 47UF 6.3V
C0214	0800227	ELECTROLYTIC 47UF 6.3V	C0288	0893014	CERAMIC CHIP 0.01UF+10% 25V
C0215	0893014	CERAMIC CHIP 0.01UF+10% 25V	C0289	0893014	CERAMIC CHIP 0.01UF+10% 25V
C0216	0800217	ELECTROLYTIC 3.3UF 35V	C0295	0800219	ELECTROLYTIC 10UF 16V
C0217	0209944	CERAMIC CHIP 150PF+5% 50V	C0296	0893021	CERAMIC CHIP 0.033UF+10% 50V
C0218	0209925	CERAMIC DISC 5PF+0.25%	C0297	0209938	CERAMIC CHIP 47PF+5% 50V
C0219	0800218	ELECTROLYTIC 4.7UF 25V	C0298	0893018	CERAMIC CHIP 0.022UF+10% 25V
C0220	0893021	CERAMIC CHIP 0.033UF+10% 50V	C0299	0893014	CERAMIC CHIP 0.01UF+10% 25V
C0221	0800218	ELECTROLYTIC 4.7UF 25V	C0300	0209948	CERAMIC CHIP 330PF+5% 50V
C0222	0209937	CERAMIC CHIP 39PF+5% 50V	C0301	0209942	CERAMIC CHIP 100PF+5% 50V
C0224	0800214	ELECTROLYTIC 0.47UF 50V	C0304	0209942	CERAMIC CHIP 100PF+5% 50V
C0225	0893027	CERAMIC CHIP 0.1UF+10% 25V	C0402	0800218	ELECTROLYTIC 4.7UF 25V
C0227	0893021	CERAMIC CHIP 0.033UF+10% 50V	C0403	0893004	CERAMIC CHIP 0.047UF+10% 16V
C0228	0800219	ELECTROLYTIC 10UF 16V	C0405	0800219	ELECTROLYTIC 10UF 16V
C0229	0800227	ELECTROLYTIC 47UF 6.3V	C0406	0893033	CERAMIC CHIP 1500PF+10% 50V
C0230	0893014	CERAMIC CHIP 0.01UF+10% 25V	C0408	0800219	ELECTROLYTIC 10UF 16V
C0231	0800221	ELECTROLYTIC 22UF 6.3V	C0409	0893016	CERAMIC CHIP 0.015UF+10% 25V
C0232	0800218	ELECTROLYTIC 4.7UF 25V	C0410	0800219	ELECTROLYTIC 10UF 16V
C0233	0893027	CERAMIC CHIP 0.1UF+10% 25V	C0411	0893027	CERAMIC CHIP 0.1UF+10% 25V
C0234	0800219	ELECTROLYTIC 10UF 16V	C0412	0893027	CERAMIC CHIP 0.1UF+10% 25V
C0235	0800219	ELECTROLYTIC 10UF 16V	C0413	0800215	ELECTROLYTIC 1UF 50V
C0236	0893014	CERAMIC CHIP 0.01UF+10% 25V	C0415	0800218	ELECTROLYTIC 4.7UF 25V
C0237	AA00354R	CERAMIC CHIP 0.47UF+10% 16V	C0416	0893018	CERAMIC CHIP 0.022UF+10% 25V
C0238	0800217	ELECTROLYTIC 3.3UF 35V	C0417	0893014	CERAMIC CHIP 0.01UF+10% 25V
C0239	0893027	CERAMIC CHIP 0.1UF+10% 25V	C0418	0893018	CERAMIC CHIP 0.022UF+10% 25V
C0240	0893018	CERAMIC CHIP 0.022UF+10% 25V	C0422	0800217	ELECTROLYTIC 3.3UF 35V
C0241	0893004	CERAMIC CHIP 0.047UF+10% 16V	C0424	0800234	ELECTROLYTIC 220UF 6.3V
C0242	0893027	CERAMIC CHIP 0.1UF+10% 25V	C0425	0893014	CERAMIC CHIP 0.01UF+10% 25V
C0243	0209930	CERAMIC CHIP 10PF+0.5% 50V	C0426	0893021	CERAMIC CHIP 0.033UF+10% 50V
C0244	0893027	CERAMIC CHIP 0.1UF+10% 25V	C0427	0800234	ELECTROLYTIC 220UF 6.3V
C0245	0209944	CERAMIC CHIP 150PF+5% 50V	C0428	0893014	CERAMIC CHIP 0.01UF+10% 25V
C0247	0800219	ELECTROLYTIC 10UF 16V	C0429	0893041	CERAMIC CHIP 5600PF+10% 50V
C0251	0893014	CERAMIC CHIP 0.01UF+10% 25V	C0430	AF10115R	CHIP CAPASITOR 0.018UF+5% 50V
C0253	0893027	CERAMIC CHIP 0.1UF+10% 25V	C0431	0204273	POLYESTER FILM 6800PF+5% 100V
C0254	0800218	ELECTROLYTIC 4.7UF 25V	C0432	0209946	CERAMIC CHIP 220PF+5% 50V
C0255	0209949	CERAMIC DISC 390PF+5% 50V	C0438	0800211	ELECTROLYTIC 0.1UF 50V
C0256	0893014	CERAMIC CHIP 0.01UF+10% 25V	C0439	0800211	ELECTROLYTIC 0.1UF 50V
C0257	0800217	ELECTROLYTIC 3.3UF 35V	C0440	0800213	ELECTROLYTIC 0.33UF 50V
C0258	0893014	CERAMIC CHIP 0.01UF+10% 25V	C0441	0800221	ELECTROLYTIC 22UF 6.3V
C0261	0800215	ELECTROLYTIC 1UF 50V	C0442	0893067	CERAMIC CHIP 0.1UF+80-20% 25V
C0262	0209929	CERAMIC CHIP 9.0PF+0.5% 50V	C0443	0800227	ELECTROLYTIC 47UF 6.3V
C0263	0893027	CERAMIC CHIP 0.1UF+10% 25V	C0447	0800219	ELECTROLYTIC 10UF 16V
C0264	0893014	CERAMIC CHIP 0.01UF+10% 25V	C0449	0800223	ELECTROLYTIC 22UF 16V
C0265	0893014	CERAMIC CHIP 0.01UF+10% 25V	C0451	0800221	ELECTROLYTIC 22UF 6.3V
C0266	0893038	CERAMIC CHIP 3900PF+10% 50V	C0454	0800219	ELECTROLYTIC 10UF 16V
C0267	0800234	ELECTROLYTIC 220UF 6.3V	C0455	0893067	CERAMIC CHIP 0.1UF+80-20% 25V
C0268	0209942	CERAMIC CHIP 100PF+5% 50V	C0456	0893014	CERAMIC CHIP 0.01UF+10% 25V
C0270	0893038	CERAMIC CHIP 3900PF+10% 50V	C0501	0800217	ELECTROLYTIC 3.3UF 35V
C0271	0893027	CERAMIC CHIP 0.1UF+10% 25V	C0502	0255883	ELECTROLYTIC 220UF 16V
C0272	0893018	CERAMIC CHIP 0.022UF+10% 25V	C0503	0255883	ELECTROLYTIC 220UF 16V
C0273	0209943	CERAMIC DISC 120PF+5%	C0504	0255883	ELECTROLYTIC 220UF 16V
			C0505	0893018	CERAMIC CHIP 0.022UF+10% 25V
			C0506	0893067	CERAMIC CHIP 0.1UF+80-20% 25V
			C0507	0255883	ELECTROLYTIC 220UF 16V

SYMBOL NO	P-NO	DESCRIPTION	SYMBOL NO	P-NO	DESCRIPTION
C0508	0255883	ELECTROLYTIC 220UF 16V	C0944	0800234	ELECTROLYTIC 220UF 6.3V
C0509	0893062	CERAMIC CHIP 1UF+80-20% 16V	C0945	0893014	CERAMIC CHIP 0.01UF+-10% 25V
C0510	0893062	CERAMIC CHIP 1UF+80-20% 16V	C0946	0209942	CERAMIC CHIP 100PF+-5% 50V
C0511	0800236	ELECTROLYTIC 22UF 50V	C0947	0800215	ELECTROLYTIC 1UF 50V
C0512	0800236	ELECTROLYTIC 22UF 50V	C0949	0893035	CERAMIC CHIP 2200PF+-10% 50V
C0513	0893018	CERAMIC CHIP 0.022UF+-10% 25V	C0950	0800215	ELECTROLYTIC 1UF 50V
C0517	0893067	CERAMIC CHIP 0.1UF+80-20% 25V	C0951	0209934	CERAMIC CHIP 22PF+-5% 50V
C0518	0893067	CERAMIC CHIP 0.1UF+80-20% 25V	C0952	0209935	CERAMIC CHIP 27PF+-5% 50V
C0519	0893033	CERAMIC CHIP 1500PF+-10% 50V	R0205	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W
C0520	0800214	ELECTROLYTIC 0.47UF 50V	R0207	0103860	CHIP RESISTOR 27KOHM+-5% 0.1W
C0521	0893039	CERAMIC CHIP 4700PF+-10% 50V	R0211	0103835	CHIP RESISTOR 220 OHM+-5% 0.1W
C0522	0893039	CERAMIC CHIP 4700PF+-10% 50V	R0212	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
C0523	0893031	CERAMIC CHIP 1000PF+-10% 50V	R0213	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
C0524	0893031	CERAMIC CHIP 1000PF+-10% 50V	R0214	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
C0525	0893031	CERAMIC CHIP 1000PF+-10% 50V	R0217	0103857	CHIP RESISTOR 15KOHM+-5% 0.1W
C0526	0893039	CERAMIC CHIP 4700PF+-10% 50V	R0218	0103834	CHIP RESISTOR 1800HM+-5% 0.1W
C0527	0893067	CERAMIC CHIP 0.1UF+80-20% 25V	R0219	0103845	CHIP RESISTOR 1.5KOHM+-5% 0.1W
C0532	0893067	CERAMIC CHIP 0.1UF+80-20% 25V	R0220	0103853	CHIP RESISTOR 6.8KOHM+-5% 0.1W
C0534	0800229	ELECTROLYTIC 47UF 16V	R0221	0103861	CHIP RESISTOR 33KOHM+-5% 0.1W
C0536	0893027	CERAMIC CHIP 0.1UF+-10% 25V	R0222	0103849	CHIP RESISTOR 3.3KOHM+-5% 0.1W
C0537	0800234	ELECTROLYTIC 220UF 6.3V	R0228	0103844	CHIP RESISTOR 1.2KOHM+-5% 0.1W
C0538	0800234	ELECTROLYTIC 220UF 6.3V	R0229	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
C0606	0893018	CERAMIC CHIP 0.022UF+-10% 25V	R0230	0103846	CHIP RESISTOR 1.8KOHM+-5% 0.1W
C0608	0893021	CERAMIC CHIP 0.033UF+-10% 50V	R0233	0103865	CHIP RESISTOR 68KOHM+-5% 0.1W
C0609	0893013	CERAMIC CHIP 0.22UF+-10% 16V	R0234	0103854	CHIP RESISTOR 8.2KOHM+-5% 0.1W
C0614	0893031	CERAMIC CHIP 1000PF+-10% 50V	R0235	0103842	CHIP RESISTOR 820 OHM+-5% 0.1W
C0615	0893027	CERAMIC CHIP 0.1UF+-10% 25V	R0236	0103841	CHIP RESISTOR 680 OHM+-5% 0.1W
C0616	0800219	ELECTROLYTIC 10UF 16V	R0237	0103835	CHIP RESISTOR 220 OHM+-5% 0.1W
C0617	0800221	ELECTROLYTIC 22UF 6.3V	R0238	0103842	CHIP RESISTOR 820 OHM+-5% 0.1W
C0618	0209949	CERAMIC DISC 390PF+-5% 50V	R0239	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
C0619	0893039	CERAMIC CHIP 4700PF+-10% 50V	R0242	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
C0621	0893067	CERAMIC CHIP 0.1UF+80-20% 25V	R0243	0103836	CHIP RESISTOR 270 OHM+-5% 0.1W
C0622	0893014	CERAMIC CHIP 0.01UF+-10% 25V	R0244	0103837	CHIP RESISTOR 330 OHM+-5% 0.1W
C0901	0893067	CERAMIC CHIP 0.1UF+80-20% 25V	R0245	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
C0903	0893062	CERAMIC CHIP 1UF+80-20% 16V	R0246	0104267	CHIP RESISTOR 75 OHM+-1% 1/10W
C0904	0800221	ELECTROLYTIC 22UF 6.3V	R0247	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
C0905	0800215	ELECTROLYTIC 1UF 50V	R0249	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
C0906	0893067	CERAMIC CHIP 0.1UF+80-20% 25V	R0250	0103845	CHIP RESISTOR 1.5KOHM+-5% 0.1W
C0907	0893031	CERAMIC CHIP 1000PF+-10% 50V	R0251	0104267	CHIP RESISTOR 75 OHM+-1% 1/10W
C0908	0893062	CERAMIC CHIP 1UF+80-20% 16V	R0253	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
C0909	0893031	CERAMIC CHIP 1000PF+-10% 50V	R0254	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
C0910	0893021	CERAMIC CHIP 0.033UF+-10% 50V	R0257	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W
C0911	0893021	CERAMIC CHIP 0.033UF+-10% 50V	R0259	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W
C0913	0893014	CERAMIC CHIP 0.01UF+-10% 25V	R0260	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
C0914	0893021	CERAMIC CHIP 0.033UF+-10% 50V	R0261	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
C0916	0893062	CERAMIC CHIP 1UF+80-20% 16V	R0262	0103837	CHIP RESISTOR 330 OHM+-5% 0.1W
C0917	0893062	CERAMIC CHIP 1UF+80-20% 16V	R0264	0103835	CHIP RESISTOR 220 OHM+-5% 0.1W
C0918	0893062	CERAMIC CHIP 1UF+80-20% 16V	R0265	0103835	CHIP RESISTOR 220 OHM+-5% 0.1W
C0919	0209933	CERAMIC CHIP 18PF+-5% 50V	R0266	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
C0920	0209934	CERAMIC CHIP 22PF+-5% 50V	R0267	0103839	CHIP RESISTOR 4700HM+-5% 0.1W
C0921	0893014	CERAMIC CHIP 0.01UF+-10% 25V	R0269	0103839	CHIP RESISTOR 4700HM+-5% 0.1W
C0923	0893014	CERAMIC CHIP 0.01UF+-10% 25V	R0273	0103845	CHIP RESISTOR 1.5KOHM+-5% 0.1W
C0924	0893031	CERAMIC CHIP 1000PF+-10% 50V	R0274	0103833	CHIP RESISTOR 150 OHM+-5% 0.1W
C0925	0893014	CERAMIC CHIP 0.01UF+-10% 25V	R0276	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
C0926	0893031	CERAMIC CHIP 1000PF+-10% 50V	R0278	0103881	CHIP RESISTOR 2.2MOHM+-10% 0.1W
C0929	0893067	CERAMIC CHIP 0.1UF+80-20% 25V	R0402	0103858	CHIP RESISTOR 18KOHM+-5% 0.1W
C0930	0893062	CERAMIC CHIP 1UF+80-20% 16V	R0403	0103839	CHIP RESISTOR 4700HM+-5% 0.1W
C0931	0893031	CERAMIC CHIP 1000PF+-10% 50V	R0404	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
C0933	0893014	CERAMIC CHIP 0.01UF+-10% 25V	R0405	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W
C0934	0893014	CERAMIC CHIP 0.01UF+-10% 25V	R0406	0103819	CHIP RESISTOR 10 OHM+-5% 0.1W
C0935	0893014	CERAMIC CHIP 0.01UF+-10% 25V	R0407	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W
C0936	0209936	CERAMIC CHIP 33PF+-5% 50V	R0408	0103832	CHIP RESISTOR 1200HM+-5% 0.1W
C0937	0209936	CERAMIC CHIP 33PF+-5% 50V	R0409	0103871	CHIP RESISTOR 220KOHM+-5% 0.1W
C0939	0893014	CERAMIC CHIP 0.01UF+-10% 25V	R0410	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
C0943	0893067	CERAMIC CHIP 0.1UF+80-20% 25V	R0411	0103869	CHIP RESISTOR 150KOHM+-5% 0.1W

SYMBOL NO	P-NO	DESCRIPTION	SYMBOL NO	P-NO	DESCRIPTION
R0412	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W	R0605	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0413	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W	R0606	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0414	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W	R0611	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R0415	0103871	CHIP RESISTOR 220KOHM+-5% 0.1W	R0612	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R0416	0103856	CHIP RESISTOR 12KOHM+-5% 0.1W	R0625	0103879	CHIP RESISTOR 1MOHM+-5% 0.1W
R0417	0103849	CHIP RESISTOR 3.3KOHM+-5% 0.1W	R0627	0103845	CHIP RESISTOR 1.5KOHM+-5% 0.1W
R0418	0103840	CHIP RESISTOR 560 OHM+-5% 0.1W	R0628	0103833	CHIP RESISTOR 150 OHM+-5% 0.1W
R0420	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W	R0629	0103833	CHIP RESISTOR 150 OHM+-5% 0.1W
R0421	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W	R0630	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0422	0103844	CHIP RESISTOR 1.2KOHM+-5% 0.1W	R0632	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R0423	0103835	CHIP RESISTOR 220 OHM+-5% 0.1W	R0634	0103865	CHIP RESISTOR 68KOHM+-5% 0.1W
R0425	0103856	CHIP RESISTOR 12KOHM+-5% 0.1W	R0636	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0428	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W	R0831	0105573	CHIP RESISTOR 130KOHM+-1% 1/10W
R0429	0103839	CHIP RESISTOR 470OHM+-5% 0.1W	R0832	0103875	CHIP RESISTOR 470KOHM+-5% 0.1W
R0430	0103853	CHIP RESISTOR 6.8KOHM+-5% 0.1W	R0833	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R0434	0103856	CHIP RESISTOR 12KOHM+-5% 0.1W	R0836	0103875	CHIP RESISTOR 470KOHM+-5% 0.1W
R0436	0103856	CHIP RESISTOR 12KOHM+-5% 0.1W	R0901	0104111	CHIP RESISTOR 10KOHM+-1% 1/10W
R0440	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	R0902	0104262	CHIP RESISTOR 6.8KOHM+-1% 0.1W
R0443	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W	R0903	0104111	CHIP RESISTOR 10KOHM+-1% 1/10W
R0448	0103879	CHIP RESISTOR 1MOHM+-5% 0.1W	R0904	0104121	CHIP RESISTOR 27KOHM+-1% 1/10W
R0449	0103849	CHIP RESISTOR 3.3KOHM+-5% 0.1W	R0905	0103834	CHIP RESISTOR 180OHM+-5% 0.1W
R0450	0103856	CHIP RESISTOR 12KOHM+-5% 0.1W	R0906	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0451	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	R0907	0103848	CHIP RESISTOR 2.7KOHM+-5% 0.1W
R0453	0103879	CHIP RESISTOR 1MOHM+-5% 0.1W	R0908	AQ00064R	CHIP RESISTOR 100KOHM+-5% 1/16W
R0454	0103861	CHIP RESISTOR 33KOHM+-5% 0.1W	R0909	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0458	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W	R0910	0103849	CHIP RESISTOR 3.3KOHM+-5% 0.1W
R0459	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W	R0912	0103856	CHIP RESISTOR 12KOHM+-5% 0.1W
R0460	0103848	CHIP RESISTOR 2.7KOHM+-5% 0.1W	R0913	AQ00077R	CHIP RESISTOR 1MOHM+-5% 1/16W
R0462	0103848	CHIP RESISTOR 2.7KOHM+-5% 0.1W	R0914	0103876	CHIP RESISTOR 560KOHM+-5% 0.1W
R0463	0103861	CHIP RESISTOR 33KOHM+-5% 0.1W	R0915	AQ00077R	CHIP RESISTOR 1MOHM+-5% 1/16W
R0464	0103850	CHIP RESISTOR 3.9KOHM+-5% 0.1W	R0921	AQ00042R	CHIP RESISTOR 2.2KOHM+-5% 1/16W
R0465	0103844	CHIP RESISTOR 1.2KOHM+-5% 0.1W	R0925	AQ00046R	CHIP RESISTOR 4.7KOHM+-5% 1/16W
R0466	0103875	CHIP RESISTOR 470KOHM+-5% 0.1W	R0926	AQ00046R	CHIP RESISTOR 4.7KOHM+-5% 1/16W
R0469	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	R0933	AQ00046R	CHIP RESISTOR 4.7KOHM+-5% 1/16W
R0503	0103827	CHIP RESISTOR 47 OHM+-5% 0.1W	R0934	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R0504	0104304	CHIP RESISTOR 22KOHM+-0.5% 1/16W	R0936	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R0505	0103832	CHIP RESISTOR 120OHM+-5% 0.1W	R0939	0103830	CHIP RESISTOR 82OHM+-5% 0.1W
R0506	0105121	CHIP RESISTOR 390 OHM+-1% 1/10W	R0940	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R0507	0103841	CHIP RESISTOR 680 OHM+-5% 0.1W	R0942	0104262	CHIP RESISTOR 6.8KOHM+-1% 0.1W
R0508	0103818	CHIP RESISTOR 8.2OHM+-10% 0.1W	R0943	0104111	CHIP RESISTOR 10KOHM+-1% 1/10W
R0509	0103834	CHIP RESISTOR 180OHM+-5% 0.1W	R0944	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R0511	0103827	CHIP RESISTOR 47 OHM+-5% 0.1W	R0945	0104111	CHIP RESISTOR 10KOHM+-1% 1/10W
R0513	0105146	CHIP RESISTOR 75KOHM+-1% 1/10W	R0946	AQ00042R	CHIP RESISTOR 2.2KOHM+-5% 1/16W
R0515	0103844	CHIP RESISTOR 1.2KOHM+-5% 0.1W	R0947	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0517	0104305	CHIP RESISTOR 6.8KOHM+-0.5% 1/16W	R0948	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0518	0104305	CHIP RESISTOR 6.8KOHM+-0.5% 1/16W	R0949	0103839	CHIP RESISTOR 470OHM+-5% 0.1W
R0520	0104305	CHIP RESISTOR 6.8KOHM+-0.5% 1/16W	R0950	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W
R0521	0104305	CHIP RESISTOR 6.8KOHM+-0.5% 1/16W	R0951	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W
R0522	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W	R0952	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W
R0524	AQ00046R	CHIP RESISTOR 4.7KOHM+-5% 1/16W	R0953	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W
R0525	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W	R0955	AQ00024R	CHIP RESISTOR 100 OHM+-5% 1/16W
R0526	0103864	CHIP RESISTOR 56KOHM+-5% 0.1W	R0960	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R0527	0103831	CHIP RESISTOR 100 OHM+-5% 0.1W	R0961	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0528	0103827	CHIP RESISTOR 47 OHM+-5% 0.1W	R0962	0103846	CHIP RESISTOR 1.8KOHM+-5% 0.1W
R0529	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W	R0963	0103848	CHIP RESISTOR 2.7KOHM+-5% 0.1W
R0530	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W	R0964	0103849	CHIP RESISTOR 3.3KOHM+-5% 0.1W
R0531	0103826	CHIP RESISTOR 39 OHM+-5% 0.1W	R0965	0104242	METAL FILM 4.3KOHM+-5% 1/10W
R0534	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W	R0966	0103853	CHIP RESISTOR 6.8KOHM+-5% 0.1W
R0535	0104305	CHIP RESISTOR 6.8KOHM+-0.5% 1/16W	R0967	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R0536	0104305	CHIP RESISTOR 6.8KOHM+-0.5% 1/16W	R0968	0103879	CHIP RESISTOR 1MOHM+-5% 0.1W
R0537	0103852	CHIP RESISTOR 5.6KOHM+-5% 0.1W	R0969	0103839	CHIP RESISTOR 470OHM+-5% 0.1W
R0538	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	R0970	0103839	CHIP RESISTOR 470OHM+-5% 0.1W
R0540	0103831	CHIP RESISTOR 100 OHM+-5% 0.1W	R0971	0103879	CHIP RESISTOR 1MOHM+-5% 0.1W
R0541	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W	R0972	0103850	CHIP RESISTOR 3.9KOHM+-5% 0.1W
R0543	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W	R0973	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W

SYMBOL NO	P-NO	DESCRIPTION	SYMBOL NO	P-NO	DESCRIPTION
R0975	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W	Q0208	5326256	TRANSISTOR DTC343TK
R0976	0103842	CHIP RESISTOR 820 OHM+-5% 0.1W	Q0211	CA10731R	TRANSISTOR DTC124K
R0977	0103844	CHIP RESISTOR 1.2KOHM+-5% 0.1W	Q0212	CA10731R	TRANSISTOR DTC124K
R0978	0103831	CHIP RESISTOR 100 OHM+-5% 0.1W	Q0213	CA10744R	TRANSISTOR FMG1
R0979	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	Q0219	CA10583R	TRANSISTOR 2SB709A
R0980	0103862	CHIP RESISTOR 39KOHM+-5% 0.1W	Q0401	CA10732R	TRANSISTOR DTA124K
R0981	0103857	CHIP RESISTOR 15KOHM+-5% 0.1W	Q0402	5326694	TRANSISTOR FMW3
R0982	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	Q0403	CA10731R	TRANSISTOR DTC124K
R0983	0104126	CHIP RESISTOR 680KOHM+-1% 1/10W	Q0404	5326705	TRANSISTOR 1M22
R0984	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	Q0405	1323142	TRANSISTOR 2SC2411K
R0985	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	Q0406	1323142	TRANSISTOR 2SC2411K
R0986	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	Q0407	5326491	TRANSISTOR 1MX1
R0988	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W	Q0415	5326705	TRANSISTOR 1M22
R0989	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	Q0416	5326491	TRANSISTOR 1MX1
R0990	0103845	CHIP RESISTOR 1.5KOHM+-5% 0.1W	Q0419	5326491	TRANSISTOR 1MX1
R0991	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W	Q0423	CA10731R	TRANSISTOR DTC124K
R0992	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W	Q0501	CA10271R	TRANSISTOR 2SB1424
R0993	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	Q0502	CA10746R	TRANSISTOR FMC2
R0994	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W	Q0503	CA10711R	TRANSISTOR 2SC5053
R0996	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W	Q0504	1323142	TRANSISTOR 2SC2411K
R0998	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W	Q0507	5326705	TRANSISTOR 1M22
RT0601	AW10212R	SEMI VARIABLE 220KOHM	Q0508	CA10271R	TRANSISTOR 2SB1424
D0001	5380931	LED GL450	Q0509	CA10731R	TRANSISTOR DTC124K
D0201	5328306	DIODE MA152WA	Q0511	5326502	TRANSISTOR 2SD1766 (R)
D0202	5328306	DIODE MA152WA	Q0901	5326491	TRANSISTOR 1MX1
D0203	5328306	DIODE MA152WA	Q0902	5326705	TRANSISTOR 1M22
D0204	5337211	DIODE DAN217	Q0903	5326491	TRANSISTOR 1MX1
D0207	5328306	DIODE MA152WA	Q0904	CA10731R	TRANSISTOR DTC124K
D0401	CC10291R	DIODE 1SS353	Q0905	CA10583R	TRANSISTOR 2SB709A
D0403	CC10291R	DIODE 1SS353	Q0906	CA10731R	TRANSISTOR DTC124K
D0405	5337211	DIODE DAN217	Q0907	5326705	TRANSISTOR 1M22
D0408	5337211	DIODE DAN217	ZD0201	CC10458R	DIODE MA3075L
D0410	5337211	DIODE DAN217	ZD0202	CC10458R	DIODE MA3075L
D0501	5337372	DIODE SB07-03C	ZD0401	CC10458R	DIODE MA3075L
D0502	CC10291R	DIODE 1SS353	ZD0501	CC10463R	DIODE MA3100L
D0504	CC10291R	DIODE 1SS353	ZD0901	CC10454R	DIODE MA3068L
D0505	5337062	DIODE MA122	T0201	BM10171R	FILTER, MODE
D0901	5337372	DIODE SB07-03C	T0401	BS10211	TRANSFORMER
D0902	CC10291R	DIODE 1SS353	T0402	BS10201	TRANSFORMER
D0903	5337062	DIODE MA122	T0502	BV10201R	CHOKE COIL
D0904	CC10291R	DIODE 1SS353	T0503	BC10121R	TRANSFORMER
D0906	5337211	DIODE DAN217	L0201	0770028	COIL 220UH+-5%
D0907	5328306	DIODE MA152WA	L0202	5121582	COIL 100UH
D0908	5328306	DIODE MA152WA	L0203	0770012	COIL 12UH
IC0201	CK14411	IC HA118203F	L0204	5121582	COIL 100UH
IC0202	CK13931R	IC STV5727	L0205	0770008	COIL 6.8UH
IC0203	CK13471R	IC UPC5023GS-104-E1	L0206	5121582	COIL 100UH
IC0204	CK13573R	IC MSM7470-71MS-KR1	L0207	5121582	COIL 100UH
IC0501	CK10541	IC BA9706K	L0208	0770022	COIL 68UH+-5%
IC0502	1308011	TRANSISTOR MPL1	L0210	0770028	COIL 220UH+-5%
IC0901	CK14264U	IC HD6433974SB53F	L0211	5121582	COIL 100UH
IC0902	1352582	IC S-84206F	L0213	BA10308R	COIL 15UH
IC0903	CK18302R	IC SN74AHCT125PW	L0214	5121582	COIL 100UH
IC0904	1366651	IC BA6417F	L0216	0770028	COIL 220UH+-5%
IC0905	1352512	IC BA7046F	L0218	0770022	COIL 68UH+-5%
Q0001	5324661	PHOTO TRANSISTOR PT-483F1H	L0220	0770107	COIL, CHOKE 100UH+-5%
Q0002	5333952	IC ON2170LH	L0403	0770107	COIL, CHOKE 100UH+-5%
Q0003	5324661	PHOTO TRANSISTOR PT-483F1H	L0404	0770107	COIL, CHOKE 100UH+-5%
Q0004	5333391	IC NJL5161K	L0501	BH10111R	COIL 22UH
Q0201	5326712	TRANSISTOR 1MB10	L0502	BH10116R	COIL 100UH
Q0202	CA10731R	TRANSISTOR DTC124K	L0503	BH10115R	COIL 100UH
Q0203	CA10583R	TRANSISTOR 2SB709A	L0504	BH10116R	COIL 100UH
Q0204	CA10583R	TRANSISTOR 2SB709A	L0505	0770103	COIL, CHOKE 47UH+-5%
Q0205	CA10731R	TRANSISTOR DTC124K	L0506	0770103	COIL, CHOKE 47UH+-5%
Q0206	5326705	TRANSISTOR 1M22	L0508	0770101	CHOKE COIL 33UH

SYMBOL NO	P-NO	DESCRIPTION	SYMBOL NO	P-NO	DESCRIPTION
L0510	0770098	COIL, CHOKE 22UH+-5%	C1101	0893117	CERAMIC CHIP 22PF+-5% 50V
L0511	0770099	COIL, CHOKE 27UH+-5%	C1102	0893008	CERAMIC CHIP 0.1UF +-10% 16V
L0902	0770013	COIL 15UH+-5%	C1103	0893014	CERAMIC CHIP 0.01UF+-10% 25V
L0903	0770112	COIL, CHOKE 220UH+-5%	C1104	0806019	ELECTROLYTIC 2.2UF 10V
CX0201	BP10541G	CRYSTAL	C1106	0893062	CERAMIC CHIP 1UF+80-20% 16V
CX0901	BP10501	CRYSTAL	C1107	0806168	ELECTROLYTIC 47UF 6.3V
CX0902	BL10311R	CRYSTAL	C1108	0893193	CERAMIC CHIP 0.01UF+-10% 25V
CN0201	5847073	CONNECTOR	C1109	0806169	ELECTROLYTIC 47UF 16V
CN0402	5846287	CONNECTOR	C1110	0893188	CERAMIC CHIP 0.047UF+-10% 16V
CN0403	EF10365	CONNECTOR	C1111	0893225	CERAMIC CHIP 0.1UF+80-20% 16V
CN0601	EK10725	CONNECTOR	C1113	0893062	CERAMIC CHIP 1UF+80-20% 16V
CN0602	5886211	MINI CONNECTOR	C1114	0893225	CERAMIC CHIP 0.1UF+80-20% 16V
CN0902	EF10173	CONNECTOR	C1116	0893225	CERAMIC CHIP 0.1UF+80-20% 16V
CN0903	EF10172	CONNECTOR	C1117	0893225	CERAMIC CHIP 0.1UF+80-20% 16V
CN0905	EF10552	CONNECTOR	C1118	0893225	CERAMIC CHIP 0.1UF+80-20% 16V
CN0909	5815711	CONNECTOR	C1119	0893225	CERAMIC CHIP 0.1UF+80-20% 16V
CN0912	5842026	MINI CONNECTOR	C1120	0893225	CERAMIC CHIP 0.1UF+80-20% 16V
CN4490	5887042	CONNECTOR	C1121	0893225	CERAMIC CHIP 0.1UF+80-20% 16V
△F0501	5723232	FUSE 2A	C1122	0893225	CERAMIC CHIP 0.1UF+80-20% 16V
JK0401	ES10111	AV JACK	C1123	0893109	CERAMIC CHIP 7.0PF +-0.5% 50V
JK0501	5693501	JACK, DC	C1124	0893193	CERAMIC CHIP 0.01UF+-10% 25V
JK0901	EY10161	JACK	C1125	0893193	CERAMIC CHIP 0.01UF+-10% 25V
△L10901	5761771	BATTERY, BACK UP	C1126	0893193	CERAMIC CHIP 0.01UF+-10% 25V
PG0201	EA10652R	CONNECTOR	C1127	0893193	CERAMIC CHIP 0.01UF+-10% 25V
PG0401	5661688	MINI PLUG	C1128	0893193	CERAMIC CHIP 0.01UF+-10% 25V
PG0402	5666146	MINI PLUG	C1129	0893193	CERAMIC CHIP 0.01UF+-10% 25V
PG0403	5666561	MINI PLUG	C1130	0893121	CERAMIC CHIP 39PF+-5% 50V
PG0601	ED10773	PLUG	C1131	0893121	CERAMIC CHIP 39PF+-5% 50V
PG0602	5666567	MINI PLUG	C1133	0893193	CERAMIC CHIP 0.01UF+-10% 25V
PG0603	5666168	MINI PLUG	C1134	0893193	CERAMIC CHIP 0.01UF+-10% 25V
PG0901	ED10949	CONNECTOR	C1135	0893193	CERAMIC CHIP 0.01UF+-10% 25V
PG0902	5666434	PLUG	C1136	0893225	CERAMIC CHIP 0.1UF+80-20% 16V
PG0903	5666433	PLUG	C1137	0893225	CERAMIC CHIP 0.1UF+80-20% 16V
PG0905	5666185	MINI PLUG	C1138	0893114	CERAMIC CHIP 12PF+-5% 50V
PG0908	5668948	PLUG	C1139	0893062	CERAMIC CHIP 1UF+80-20% 16V
PG0909	5666561	MINI PLUG	C1141	0806169	ELECTROLYTIC 47UF 16V
PG0911	5666431	PLUG	C1142	0893193	CERAMIC CHIP 0.01UF+-10% 25V
PG0912	5666198	MINI PLUG	C1143	0806168	ELECTROLYTIC 47UF 6.3V
S0001	5601822	SWITCH	C1144	0202319	CERAMIC CHIP 22PF+-2% 50V
S0002	5635331	SWITCH	C1145	0893124	CHIP CERAMIC 68PF+-5% 50V
S0401	5610911	SWITCH	C1146	0893125	CERAMIC CHIP 82PF+-5% 50V
S0901	5621951	SWITCH	C1147	0893193	CERAMIC CHIP 0.01UF+-10% 25V
S0902	FE10211R	SWITCH	C1148	0893193	CERAMIC CHIP 0.01UF+-10% 25V
S0903	FE10211R	SWITCH	C1149	0893225	CERAMIC CHIP 0.1UF+80-20% 16V
S0904	FE10211R	SWITCH	C1150	0893062	CERAMIC CHIP 1UF+80-20% 16V
S0905	FE10211R	SWITCH	C1151	0893062	CERAMIC CHIP 1UF+80-20% 16V
S0906	FE10211R	SWITCH	C1152	0893062	CERAMIC CHIP 1UF+80-20% 16V
S0907	5634862	SWITCH	C1153	0893008	CERAMIC CHIP 0.1UF +-10% 16V
S0908	FE10211R	SWITCH	C1154	0893062	CERAMIC CHIP 1UF+80-20% 16V
S0909	FE10211R	SWITCH	C1155	0893193	CERAMIC CHIP 0.01UF+-10% 25V
S0910	FE10211R	SWITCH	C1156	0893193	CERAMIC CHIP 0.01UF+-10% 25V
S0911	FE10211R	SWITCH	C1158	0893193	CERAMIC CHIP 0.01UF+-10% 25V
S0912	5635133	SWITCH	C1159	0893193	CERAMIC CHIP 0.01UF+-10% 25V
S0913	5621702	SWITCH	C1160	0893193	CERAMIC CHIP 0.01UF+-10% 25V
			C1161	0893193	CERAMIC CHIP 0.01UF+-10% 25V
CAMERA SECTION			C1162	0893225	CERAMIC CHIP 0.1UF+80-20% 16V
C1001	0893188	CERAMIC CHIP 0.047UF+-10% 16V	C1163	0893193	CERAMIC CHIP 0.01UF+-10% 25V
C1002	0806169	ELECTROLYTIC 47UF 16V	C1166	0893193	CERAMIC CHIP 0.01UF+-10% 25V
C1003	0893062	CERAMIC CHIP 1UF+80-20% 16V	C1167	0893193	CERAMIC CHIP 0.01UF+-10% 25V
C1004	0893227	CERAMIC CHIP 0.22UF+80-20% 16V	C1168	0893193	CERAMIC CHIP 0.01UF+-10% 25V
C1005	0806163	ELECTROLYTIC 33UF 10V	C1169	0893239	CERAMIC CHIP 0.01UF+80-20% 50V
C1006	0893188	CERAMIC CHIP 0.047UF+-10% 16V	C1170	0893239	CERAMIC CHIP 0.01UF+80-20% 50V
C1008	0893062	CERAMIC CHIP 1UF+80-20% 16V	C1173	0893062	CERAMIC CHIP 1UF+80-20% 16V
C1009	0893208	CERAMIC CHIP 1000PF+-10% 50V	C1174	0893062	CERAMIC CHIP 1UF+80-20% 16V
			C1185	0893193	CERAMIC CHIP 0.01UF+-10% 25V



SYMBOL NO	P-NO	DESCRIPTION	SYMBOL NO	P-NO	DESCRIPTION
C1201	0893193	CERAMIC CHIP 0.01UF+-10% 25V	R1194	0790047	CHIP RESISTOR 5.6KOHM+-5% 1/16W
C1202	0893193	CERAMIC CHIP 0.01UF+-10% 25V	R1201	0790039	CHIP RESISTOR 1.5KOHM+-5% 1/16W
C1203	0893193	CERAMIC CHIP 0.01UF+-10% 25V	R1202	0790069	CHIP RESISTOR 0.27MOHM+-5% 1/16W
C1204	0893132	CERAMIC CHIP 270PF+-5% 50V	R1203	0790053	CHIP RESISTOR 15KOHM+-5% 1/16W
C1205	0893193	CERAMIC CHIP 0.01UF+-10% 25V	R1204	0790064	CHIP RESISTOR 100KOHM+-5% 1/16W
C1206	0893007	CERAMIC CHIP 0.082UF+-10% 16V	R1205	0790064	CHIP RESISTOR 100KOHM+-5% 1/16W
C1207	0893013	CERAMIC CHIP 0.22UF+-10% 16V	R1206	0790077	CHIP RESISTOR 1MOHM+-5% 1/16W
C1208	0893113	CERAMIC CHIP 10PF+-0.5% 50V	R1207	0790051	CHIP RESISTOR 10KOHM+-5% 1/16W
C1209	0893133	CERAMIC CHIP 330PF+-5% 50V	R1208	0790071	CHIP RESISTOR 330KOHM+-5% 1/16W
C1210	0893133	CERAMIC CHIP 330PF+-5% 50V	R1209	0790068	CHIP RESISTOR 220KOHM+-5% 1/16W
C1211	0893133	CERAMIC CHIP 330PF+-5% 50V	R1210	0790053	CHIP RESISTOR 15KOHM+-5% 1/16W
C1212	0893062	CERAMIC CHIP 1UF+80-20% 16V	R1211	0790071	CHIP RESISTOR 330KOHM+-5% 1/16W
C1301	0893225	CERAMIC CHIP 0.1UF+80-20% 16V	R1212	0790068	CHIP RESISTOR 220KOHM+-5% 1/16W
C1302	0893193	CERAMIC CHIP 0.01UF+-10% 25V	R1213	0790053	CHIP RESISTOR 15KOHM+-5% 1/16W
C1303	0893193	CERAMIC CHIP 0.01UF+-10% 25V	R1214	0790052	CHIP RESISTOR 12KOHM+-5% 1/16W
C1304	0893225	CERAMIC CHIP 0.1UF+80-20% 16V	R1215	0790052	CHIP RESISTOR 12KOHM+-5% 1/16W
C1305	0893193	CERAMIC CHIP 0.01UF+-10% 25V	R1216	0790052	CHIP RESISTOR 12KOHM+-5% 1/16W
C1311	0806168	ELECTROLYTIC 47UF 6.3V	R1217	0790052	CHIP RESISTOR 12KOHM+-5% 1/16W
C1705	0893193	CERAMIC CHIP 0.01UF+-10% 25V	R1218	0790064	CHIP RESISTOR 100KOHM+-5% 1/16W
R1001	0790044	CHIP RESISTOR 3.3KOHM+-5% 1/16W	R1219	0790031	CHIP RESISTOR 330 OHM+-5% 1/16W
R1002	0790024	CHIP RESISTOR 100 OHM+-5% 1/16W	R1221	0790046	CHIP RESISTOR 4.7KOHM+-5% 1/16W
R1003	0790077	CHIP RESISTOR 1MOHM+-5% 1/16W	R1222	0790032	CHIP RESISTOR 390 OHM+-5% 1/16W
R1004	0790077	CHIP RESISTOR 1MOHM+-5% 1/16W	R1224	0790049	CHIP RESISTOR 390 OHM+-5% 1/16W
R1011	0790024	CHIP RESISTOR 100 OHM+-5% 1/16W	R1225	0790039	CHIP RESISTOR 1.5KOHM+-5% 1/16W
R1012	0790064	CHIP RESISTOR 100KOHM+-5% 1/16W	R1226	0790051	CHIP RESISTOR 10KOHM+-5% 1/16W
R1102	0790068	CHIP RESISTOR 220KOHM+-5% 1/16W	R1301	0790032	CHIP RESISTOR 390 OHM+-5% 1/16W
R1103	0790051	CHIP RESISTOR 10KOHM+-5% 1/16W	R1302	0790032	CHIP RESISTOR 390 OHM+-5% 1/16W
R1104	0790037	CHIP RESISTOR 1KOHM+-5% 1/16W	R1303	0790032	CHIP RESISTOR 390 OHM+-5% 1/16W
R1105	0790055	CHIP RESISTOR 22KOHM+-5% 1/16W	R1304	0790032	CHIP RESISTOR 390 OHM+-5% 1/16W
R1106	0790053	CHIP RESISTOR 15KOHM+-5% 1/16W	R1322	0790061	CHIP RESISTOR 56KOHM+-5% 1/16W
R1107	0790028	CHIP RESISTOR 220 OHM+-5% 1/16W	R1323	0790061	CHIP RESISTOR 56KOHM+-5% 1/16W
R1108	0790028	CHIP RESISTOR 220 OHM+-5% 1/16W	R1330	0104579	CHIP RESISTOR 12KOHM+-1% 1/16W
R1109	0790033	CHIP RESISTOR 470 OHM+-5% 1/16W	R1701	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R1110	0790033	CHIP RESISTOR 470 OHM+-5% 1/16W	R1702	0103866	CHIP RESISTOR 82KOHM+-5% 0.1W
R1113	0790019	CHIP RESISTOR 47 OHM+-5% 1/16W	R1703	0103842	CHIP RESISTOR 820 OHM+-5% 0.1W
R1114	0104571	CHIP RESISTOR 3.9KOHM+-1% 1/16W	R1704	0103845	CHIP RESISTOR 1.5KOHM+-5% 0.1W
R1115	0105675	CHIP RESISTOR 100KOHM+-1% 1/16W	R1711	0790043	CHIP RESISTOR 2.7KOHM+-5% 1/16W
R1116	0790038	CHIP RESISTOR 1.2KOHM+-5% 1/16W	R1801	0790028	CHIP RESISTOR 220 OHM+-5% 1/16W
R1117	0790047	CHIP RESISTOR 5.6KOHM+-5% 1/16W	R1802	0790028	CHIP RESISTOR 220 OHM+-5% 1/16W
R1118	0790047	CHIP RESISTOR 5.6KOHM+-5% 1/16W	R1813	0790043	CHIP RESISTOR 2.7KOHM+-5% 1/16W
R1120	0104545	CHIP RESISTOR 1.24KOHM+-1% 1/16W	R1814	0790043	CHIP RESISTOR 2.7KOHM+-5% 1/16W
R1121	0104558	CHIP RESISTOR 5.6KOHM+-1% 1/16W	D1001	5337351	DIODE MA132WK
R1122	0104563	CHIP RESISTOR 47KOHM+-1% 1/16W	D1101	5337372	DIODE SB07-03C
R1123	0104554	CHIP RESISTOR 1KOHM+-1% 1/16W	D1103	5337422	DIODE DA221
R1124	0790037	CHIP RESISTOR 1KOHM+-5% 1/16W	D1104	5337352	DIODE MA132WA
R1125	0104559	CHIP RESISTOR 4.7KOHM+-1% 1/16W	D1303	5337422	DIODE DA221
R1126	0104533	CHIP RESISTOR 1.5KOHM+-15 1/16W	IC1001	UE12322	CCD IMAGE SENSOR ASSY
R1130	0790077	CHIP RESISTOR 1MOHM+-5% 1/16W	IC1101	1366681	IC HA118184F
R1131	0790034	CHIP RESISTOR 560 OHM+-5% 1/16W	IC1102	1365392	IC HD49319AF
R1132	0104518	CHIP RESISTOR 2.87KOHM+-1% 1/16W	IC1103	CK12132U	IC HG51CS035TEA
R1133	0104552	CHIP RESISTOR 6.8KOHM+-1% 1/16W	IC1104	CK12061R	IC UPD16510GR
R1135	0790038	CHIP RESISTOR 1.2KOHM+-5% 1/16W	IC1106	CK16512U	IC HD6433042ST31F
R1139	0790046	CHIP RESISTOR 4.7KOHM+-5% 1/16W	IC1107	CK14171R	IC MX25S67MR
R1140	0790055	CHIP RESISTOR 22KOHM+-5% 1/16W	IC1201	CK13791R	IC UPC5023GS-105-E1
R1141	0790057	CHIP RESISTOR 33KOHM+-5% 1/16W	IC1301	CK17991R	IC UPD16833G3
R1142	0790034	CHIP RESISTOR 560 OHM+-5% 1/16W	Q1001	5328221	TRANSISTOR 2SC2620-QC
R1143	0790059	CHIP RESISTOR 47KOHM+-5% 1/16W	Q1101	CA10583R	TRANSISTOR 2SB709A
R1148	0790055	CHIP RESISTOR 22KOHM+-5% 1/16W	Q1103	5328192	TRANSISTOR 2SC2462LD
R1149	0790051	CHIP RESISTOR 10KOHM+-5% 1/16W	Q1105	1323231	TRANSISTOR 2SB1462
R1150	0790037	CHIP RESISTOR 1KOHM+-5% 1/16W	Q1106	CA10583R	TRANSISTOR 2SB709A
R1151	0790037	CHIP RESISTOR 1KOHM+-5% 1/16W	Q1112	1323231	TRANSISTOR 2SB1462
R1152	0790051	CHIP RESISTOR 10KOHM+-5% 1/16W	Q1201	1323321	TRANSISTOR 2SD2216
R1171	0790038	CHIP RESISTOR 1.2KOHM+-5% 1/16W	Q1202	1323142	TRANSISTOR 2SC2411K
R1172	0790059	CHIP RESISTOR 47KOHM+-5% 1/16W	Q1203	1323142	TRANSISTOR 2SC2411K
R1188	0790037	CHIP RESISTOR 1KOHM+-5% 1/16W	L1101	BA10334R	COIL 10UH


SYMBOL NO	P-NO	DESCRIPTION	SYMBOL NO	P-NO	DESCRIPTION
L1102	BA10334R	COIL 10UH	R2037	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
L1103	BA10334R	COIL 10UH	RT2001	5035204	SEMI VARIABLE 2.2MOHM
L1106	BA10337R	COIL 100UH	RT2002	5030251	SEMI VARIABLE 1MOHM
L1109	BA10334R	COIL 10UH	RT2003	5040103	SEMI VARIABLE 470 OHM
L1110	BA10334R	COIL 10UH	D2001	CC10291R	DIODE 1SS353
L1116	BA10334R	COIL 10UH	D2002	5337321	DIODE MA199
L1117	BA10334R	COIL 10UH	IC2001	1351632	IC HA118121FP
L1701	BA10334R	COIL 10UH	Q2001	CF10361R	TRANSISTOR 2SD974
X1101	1930093	CRYSTAL	Q2002	5328241	TRANSISTOR 2SC2463E (DE)
BL1101	5172403	FILTER	ΔT2001	5240565	TRANSFORMER, FLYBACK
BL1102	5172403	FILTER	L2001	0770107	COIL, CHOKE 100UH+-5%
BL1811	5172541	FILTER	L2002	5244018	COIL 210UH
BL1812	5172541	FILTER	CN2002	EF10903	CONNECTOR
CN1015	1880368	CONNECTOR	ΔCS2001	5887004	CONNECTOR
CN1019	5845865	CONNECTOR	PG2001	5661688	MINI PLUG
CP1101	BE10411R	FILTER, LOW PASS	PG2002	5668948	PLUG
PG1015	EA11041R	CONNECTOR	PG2003	5661686	MINI PLUG
PG1017	5669167	MINI PLUG			
PG1018	5669153	PLUG			
PG1019	5669032	MINI PLUG			
PG1301	EA10377R	PLUG			
PG1701	5668955	PLUG			
S1701	5636151	SWITCH			
S1702	5636151	SWITCH			
S1703	5636151	SWITCH			
S1704	FE10211R	SWITCH			
B/W EVF[EMO]SECTION					
C2001	0800227	ELECTROLYTIC 47UF 6.3V			
C2002	0800259	ELECTROLYTIC 47UF 6.3V			
C2004	0204331	CAPACITOR 3900PF+-5% 100V			
C2005	0207709	CAPACITOR 47UF+-20% 35V			
C2006	AJ10133R	CERAMIC CAPACITOR 1000PF+-10% 1KV			
C2007	AJ10132R	CERAMIC CAPACITOR 1000PF+-10% 500V			
C2008	0800216	ELECTROLYTIC 2.2UF 50V			
C2009	0893086	CERAMIC CHIP 0.1UF+80-20% 50V			
C2011	0209898	CERAMIC CHIP 100PF+-5% 50V			
C2012	0893086	CERAMIC CHIP 0.1UF+80-20% 50V			
C2013	0893086	CERAMIC CHIP 0.1UF+80-20% 50V			
C2014	0880194	CAPACITOR 0.1UF+-5% 50V			
C2015	0202303	CERAMIC CHIP 2200PF 50V			
C2016	0893014	CERAMIC CHIP 0.01UF+-10% 25V			
C2017	0800245	ELECTROLYTIC 1UF 50V			
C2019	0893086	CERAMIC CHIP 0.1UF+80-20% 50V			
R2001	0103852	CHIP RESISTOR 5.6KOHM+-5% 0.1W			
R2002	0103869	CHIP RESISTOR 150KOHM+-5% 0.1W			
R2004	0103997	CHIP RESISTOR 1.5MOHM+-5% 1/8W			
R2006	0103819	CHIP RESISTOR 10 OHM+-5% 0.1W			
R2007	0103879	CHIP RESISTOR 1MOHM+-5% 0.1W			
R2008	0103879	CHIP RESISTOR 1MOHM+-5% 0.1W			
R2011	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W			
R2012	0103857	CHIP RESISTOR 15KOHM+-5% 0.1W			
R2013	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W			
R2014	0103848	CHIP RESISTOR 2.7KOHM+-5% 0.1W			
R2015	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W			
R2016	0103814	CHIP RESISTOR 3.9 OHM+-10% 0.1W			
R2018	0104269	CHIP RESISTOR 43KOHM+-1% 1/10W			
R2019	0103848	CHIP RESISTOR 2.7KOHM+-5% 0.1W			
R2020	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W			
R2024	0103973	CHIP RESISTOR 2.2MOHM+-5% 1/8W			
R2026	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W			
R2027	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W			
R2029	0103842	CHIP RESISTOR 820 OHM+-5% 0.1W			
R2030	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W			

# SCHEMATIC AND CIRCUIT BOARD DIAGRAMS/

## CHAPTER 6      MICROPROCESSOR PIN FUNCTION TABLE

### Cautions when using schematic diagrams

#### Caution for safety

The parts marked  are critical for safety. Be sure to use the specified parts to ensure safety when replacing them.

#### 1. Values in schematic diagrams

The values, dielectric strength (power capacitance) and tolerances of the resistors (excluding variable resistors) and capacitors are indicated in the schematic diagrams using abbreviations.

#### [Resistors]

Item	Indication
Value	No indication ..... $\Omega$
	K ..... k $\Omega$
	M ..... M $\Omega$
Tolerance	No indication ..... $\pm 5\%$ (All tolerances other than $\pm 5\%$ are indicated in the schematic diagrams)
Power capacitance	No indication ..... 1/8W (1/16W for leadless resistors without indication) All apacitances other than the above are indicated in the schematic diagrams.

#### [Capacitors]

Item	Indication
Value	No indication ..... $\mu F$
	P ..... pF
Dielectric strength	No indication ..... 50V (All dielectric strengths other than 50V are indicated in the schematic diagrams.)

#### [Coils]

Item	Indication
Value	$\mu$ ..... $\mu H$
	m ..... mH

#### 2. Markings in schematic diagrams

- Parts marked "■" with circuit numbers in the schematic diagrams are discrete parts.
- Parts marked "●" with circuit numbers in the schematic diagrams are leadless parts.

### Cautions when using circuit board diagrams

#### 1. Identifications of sides A/B in circuit board diagrams

- Board having a pattern on one side and parts on both sides.

Side A: Shows discrete parts, viewed from the pattern side.

Side B: Shows leadless parts, viewed from the pattern side.

- Board having patterns on both sides and parts on both sides.

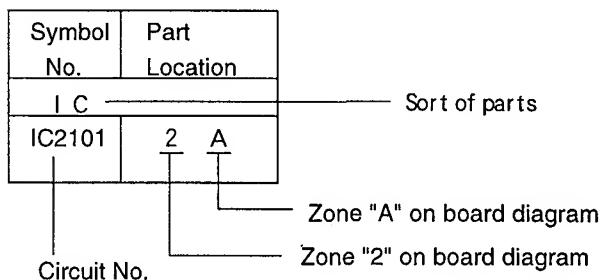
Side A: Shows parts and patterns which can be seen when the case is opened.

Side B: Shows parts and the pattern on the back of side A.

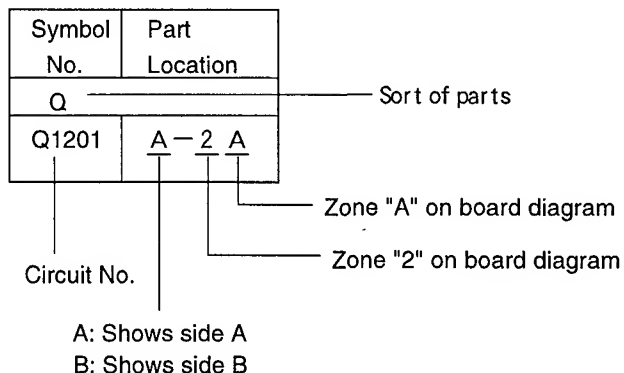
#### 2. Table for indexing locations of parts

This table shows locations of each part on the circuit board diagrams. The locations are indicated using the guide scales on the external lines of diagrams.

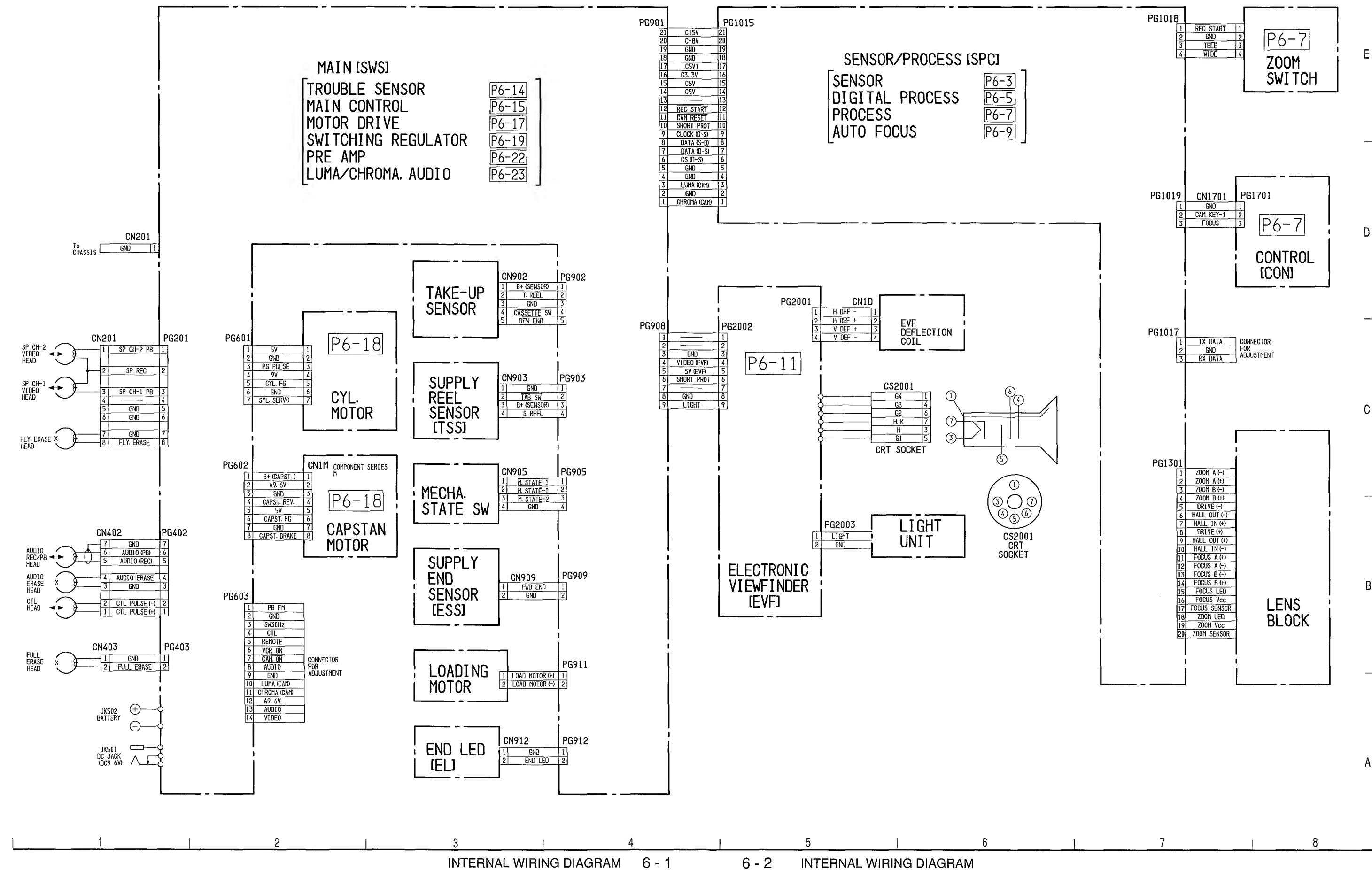
##### 1) In case of one-layer board



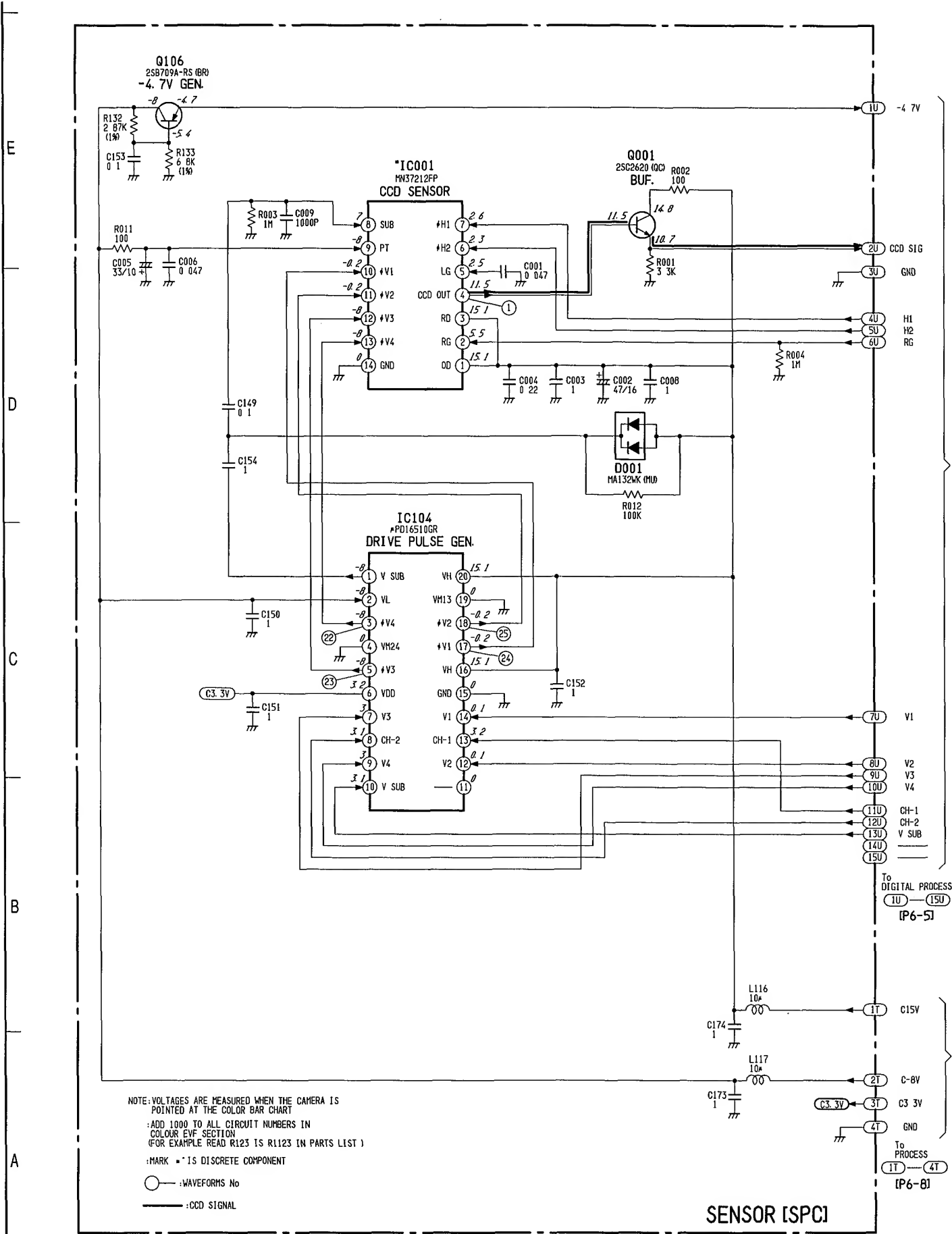
##### 2) In case of side A/B indication board



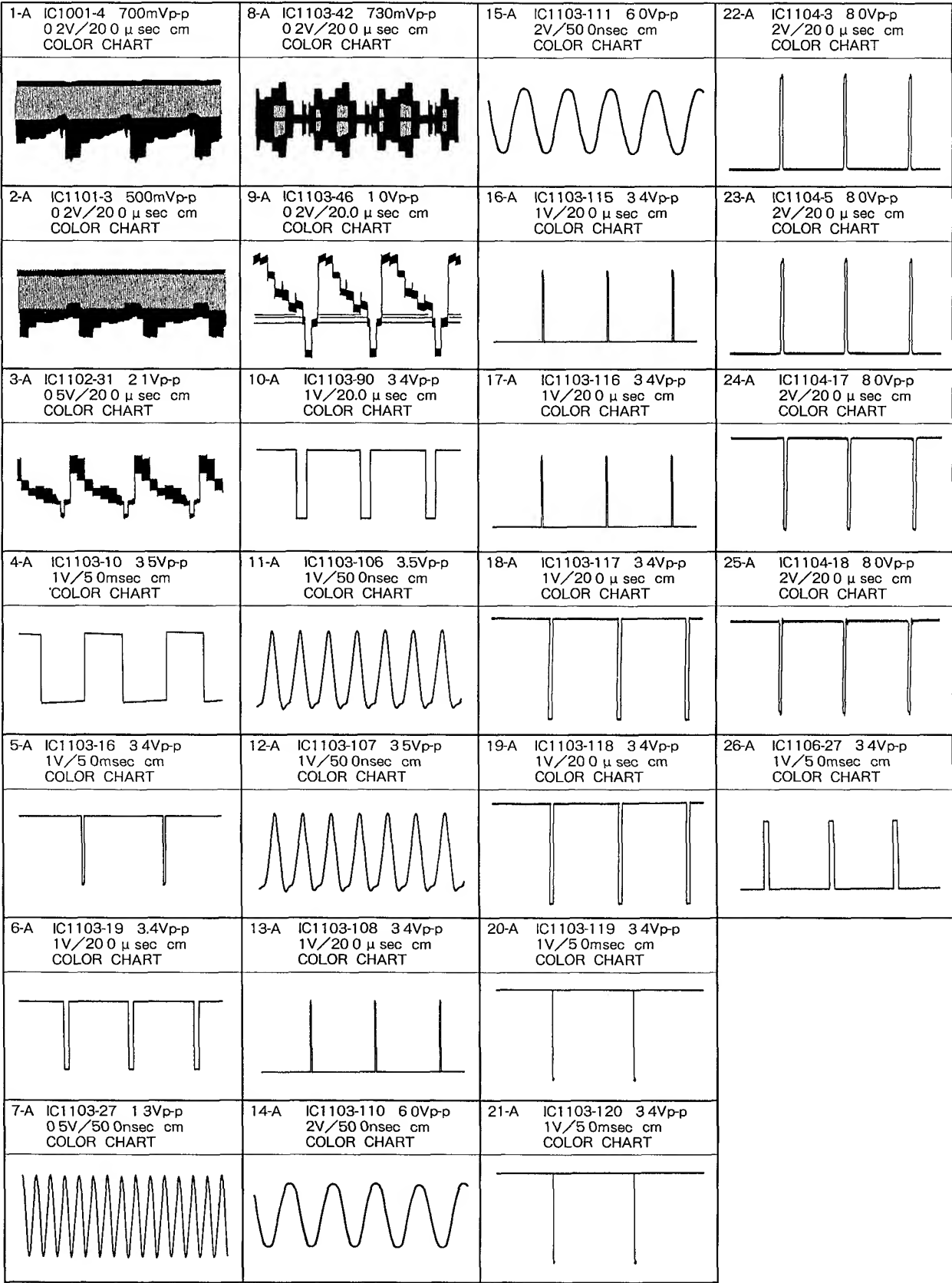
## INTERNAL WIRING DIAGRAM



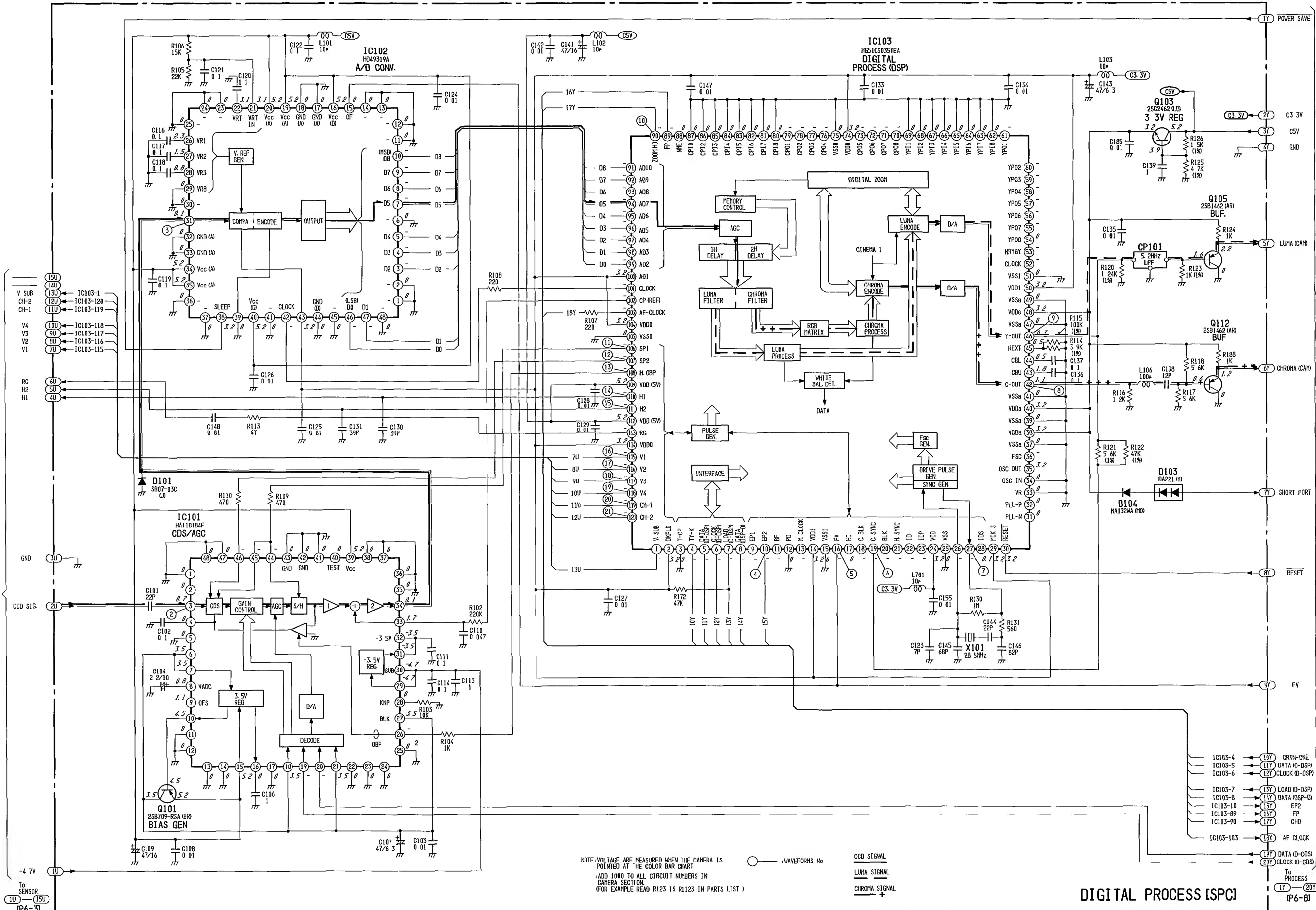
SENSOR [SPC] SCHEMATIC DIAGRAM



SENSOR/PROCESS WAVEFORMS



DIGITAL PROCESS [SPC] SCHEMATIC DIAGRAM



NOTE: VOLTAGE ARE MEASURED WHEN THE CAMERA IS POINTED AT THE COLOR BAR CHART  
ADD 1000 TO ALL CIRCUIT NUMBERS IN CAMERA SECTION  
(FOR EXAMPLE READ R123 IS R1123 IN PARTS LIST)

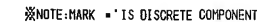
WAVEFORMS No

COD SIGNAL  
LUMA SIGNAL  
CHROMA SIGNAL

DIGITAL PROCESS [SPC]

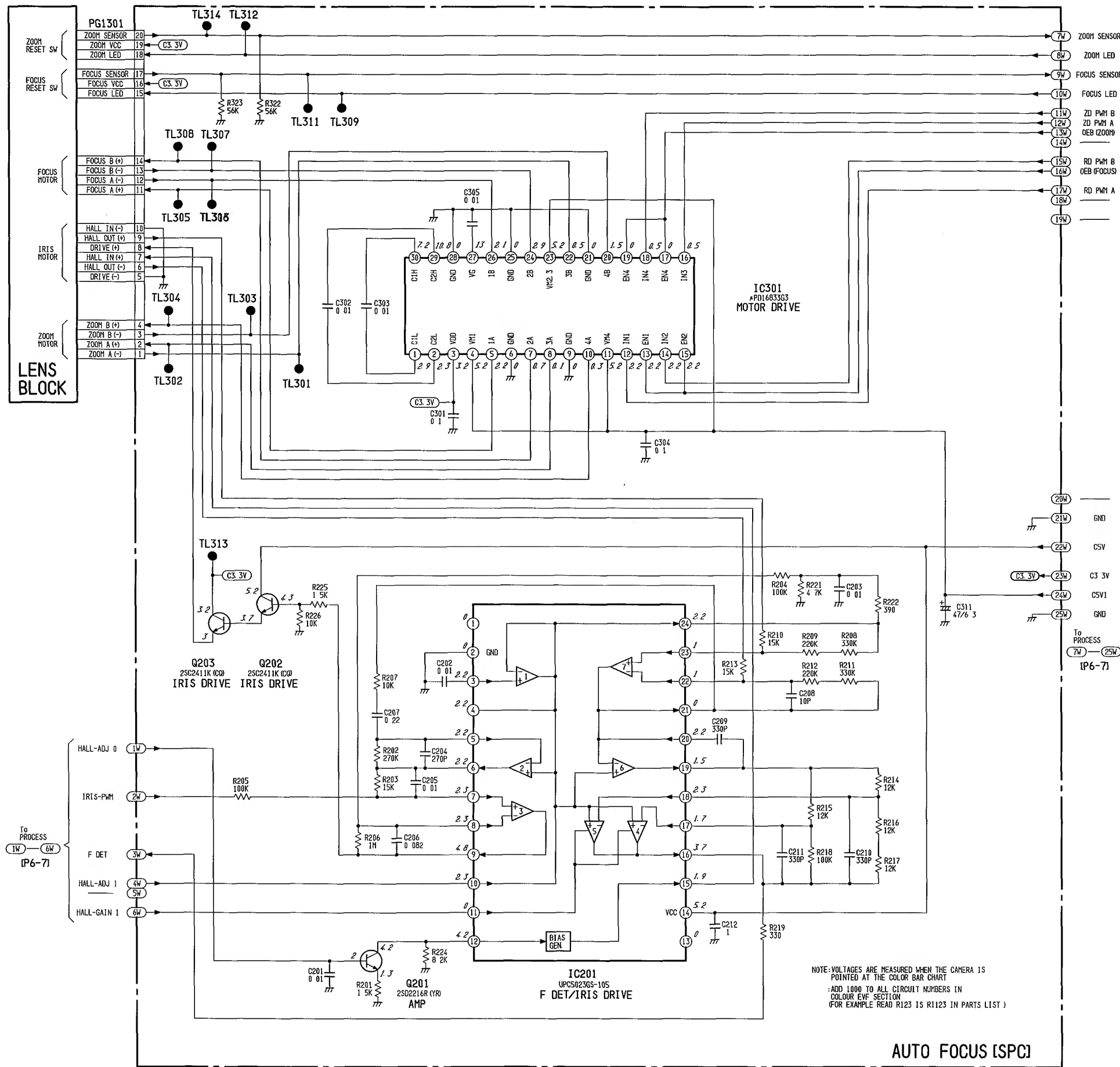
IP6-81

## A



6 - 8 PROCESS, ZOOM SWITCH, CONTROL

AUTO FOCUS [SPC] SCHEMATIC DIAGRAM



E  
D  
C  
B  
A



## C

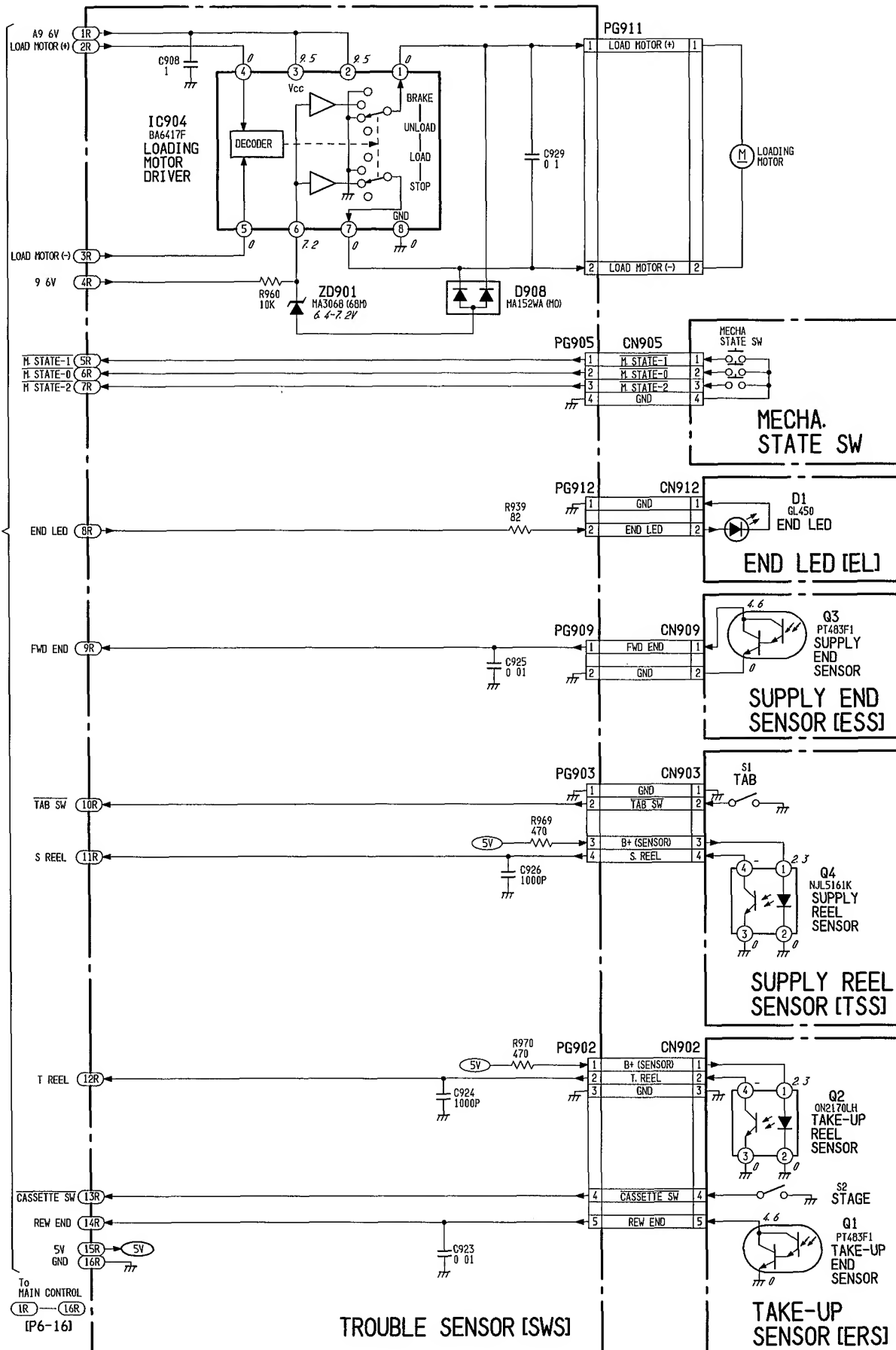


## A

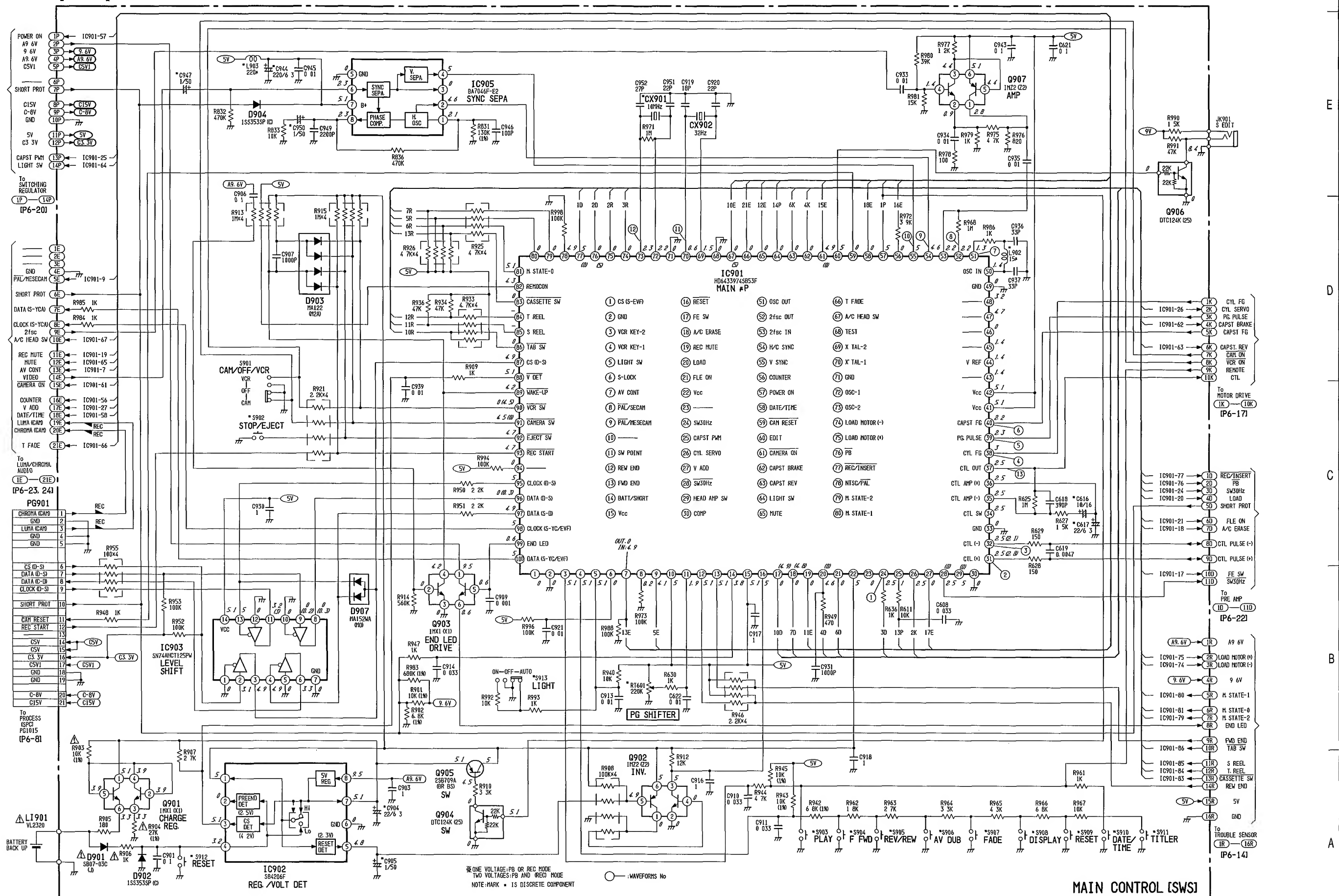




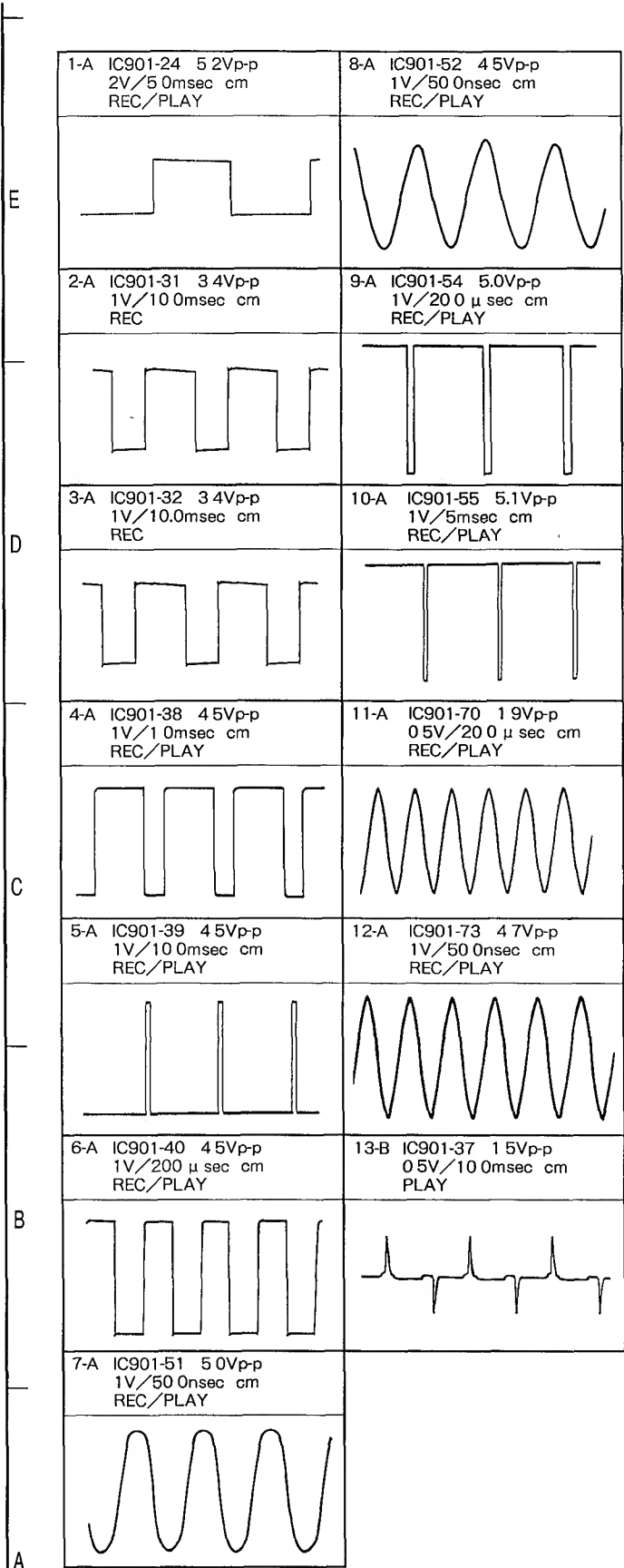
# TROUBLE SENSOR [SWS] SCHEMATIC DIAGRAM



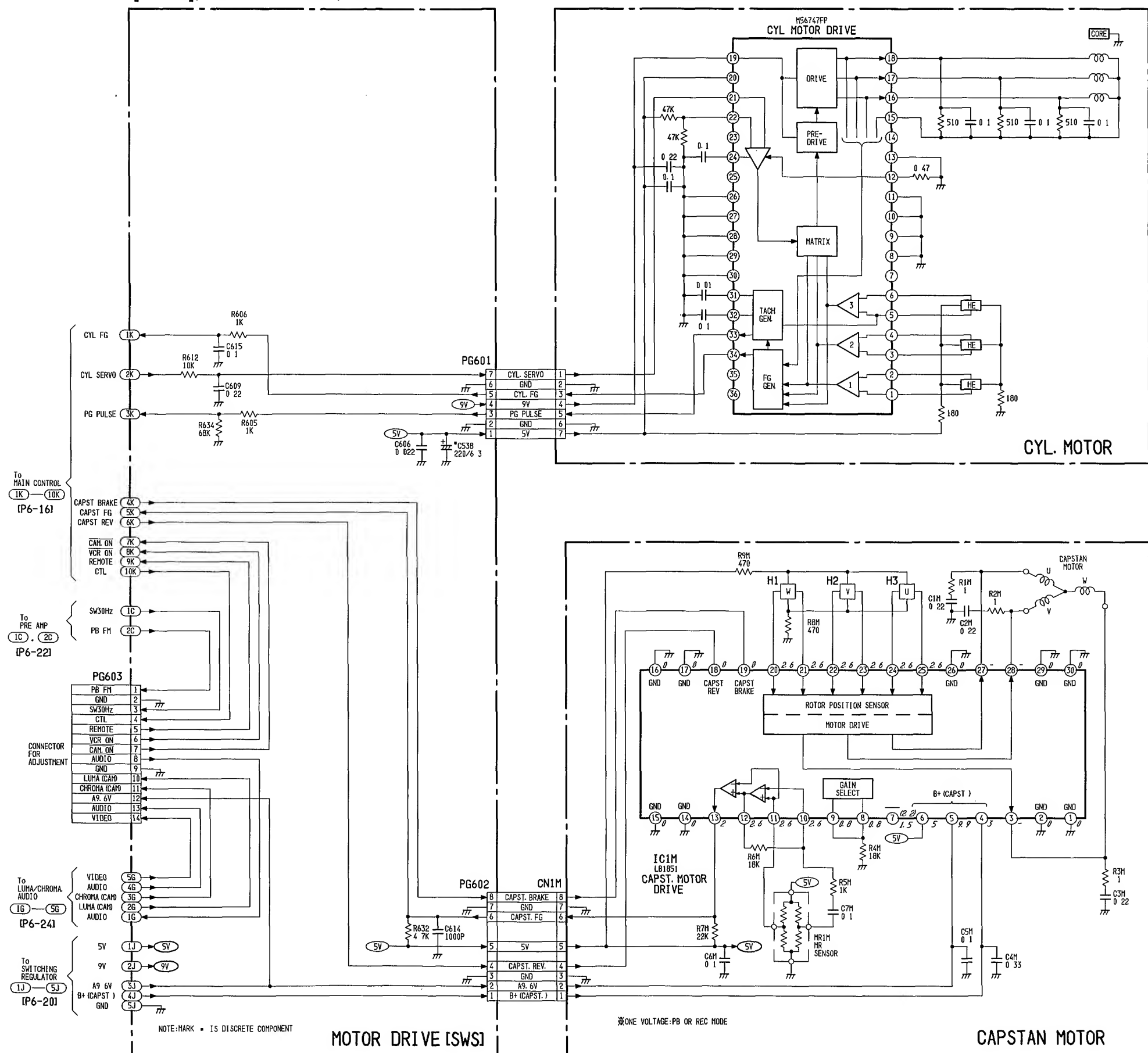
# MAIN CONTROL [SWS] SCHEMATIC DIAGRAM



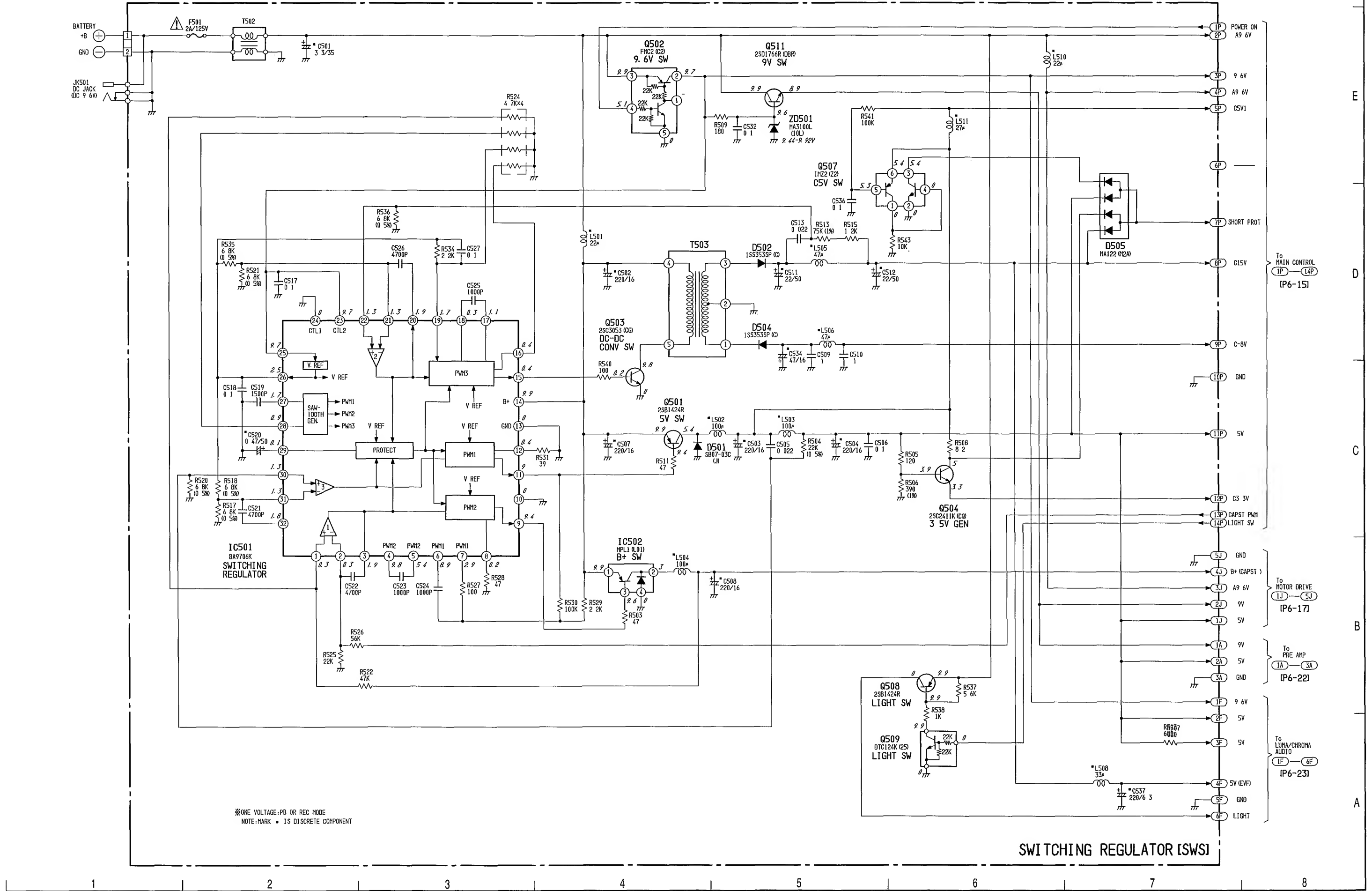
SERVO WAVEFORMS



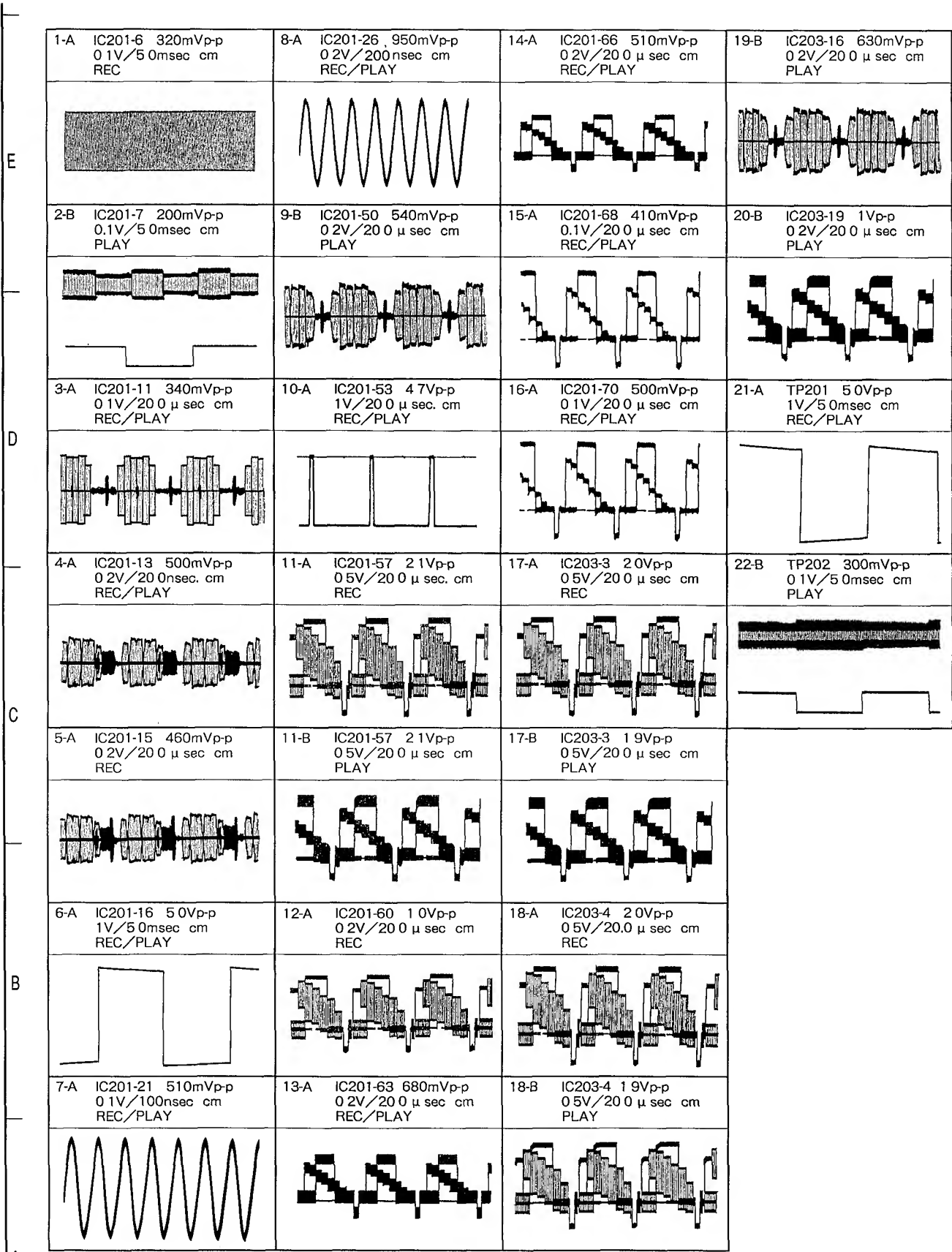
MOTOR DRIVE [SWS], CYL.MOTOR, CAPSTAN MOTOR DRIVE SCHEMATIC DIAGRAMS



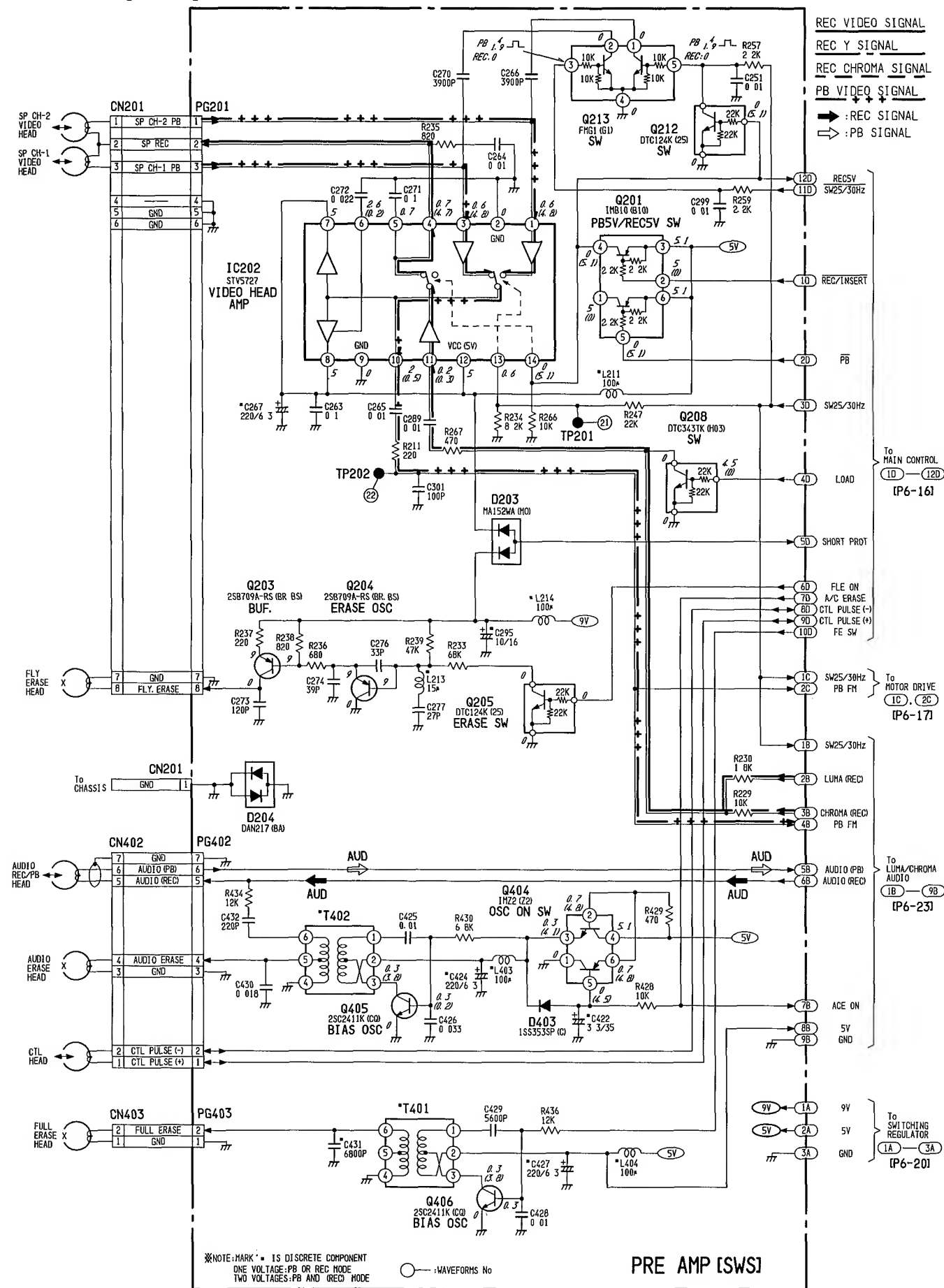
SWITCHING REGULATOR [SWS] SCHEMATIC DIAGRAM



LUMA/CHROMA WAVEFORMS



PRE AMP [SWS] SCHEMATIC DIAGRAMS



NOTE: MARK \* IS DISCRETE COMPONENT ONE VOLTAGE: PB OR REC MODE TWO VOLTAGES: PB AND REC MODE WAVEFORMS No

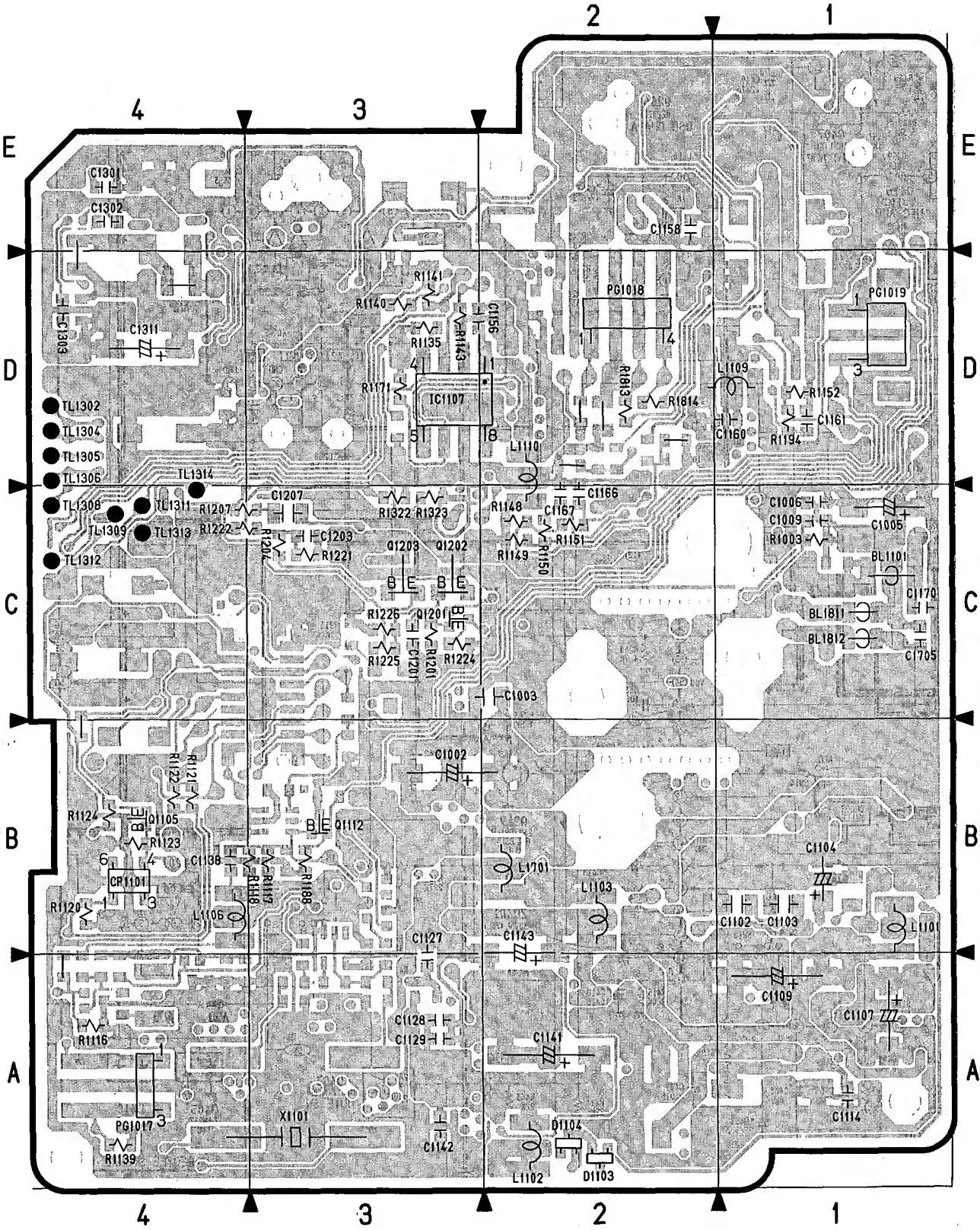
REC/EE SIGNAL  
REC Y SIGNAL  
REC CHROMA SIGNAL  
PB VIDEO SIGNAL  
PB CHROMA SIGNAL  
PB Y SIGNAL  
REC SIGNAL  
PB SIGNAL

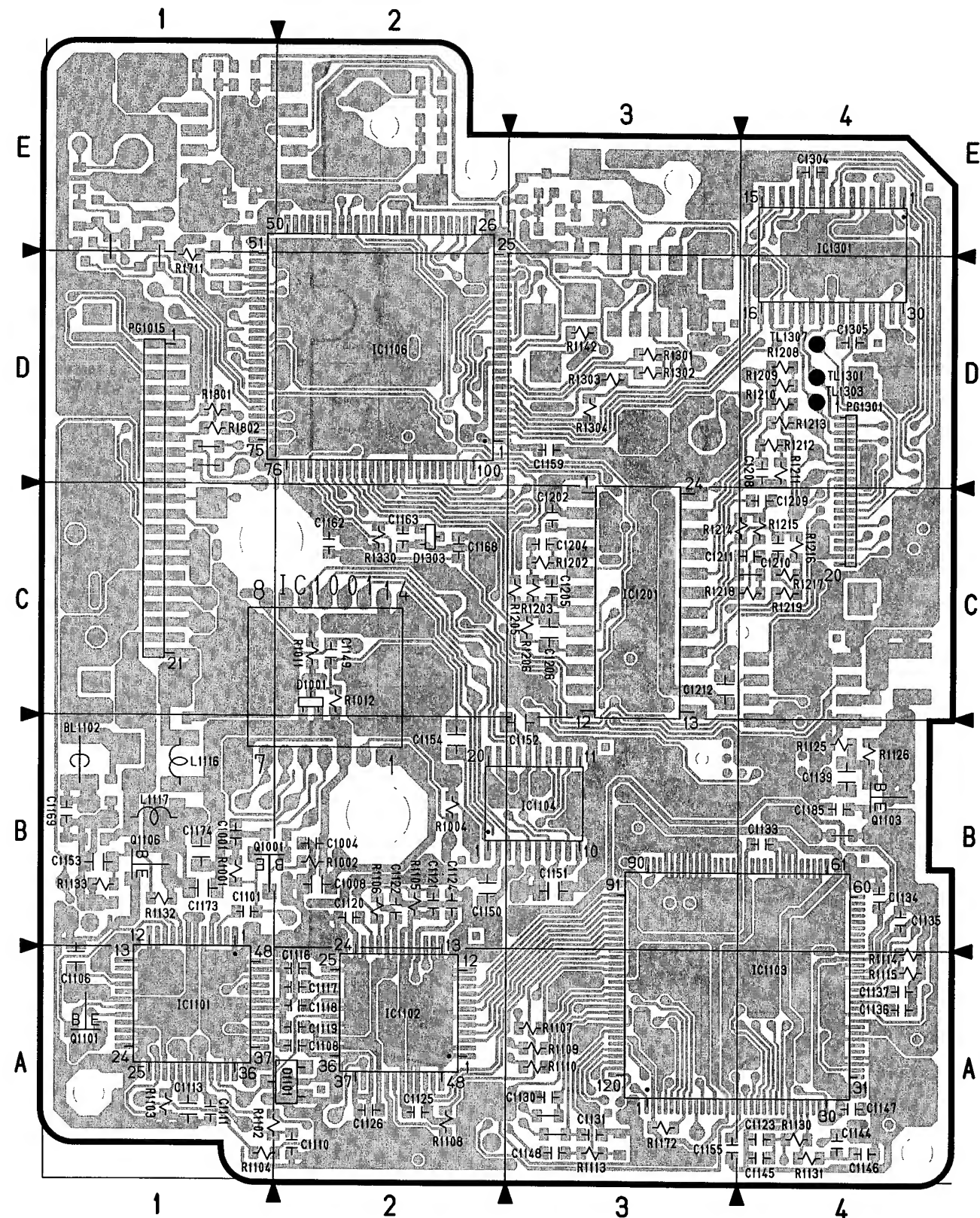
LUMA/CHROMA, AUDIO (SW)



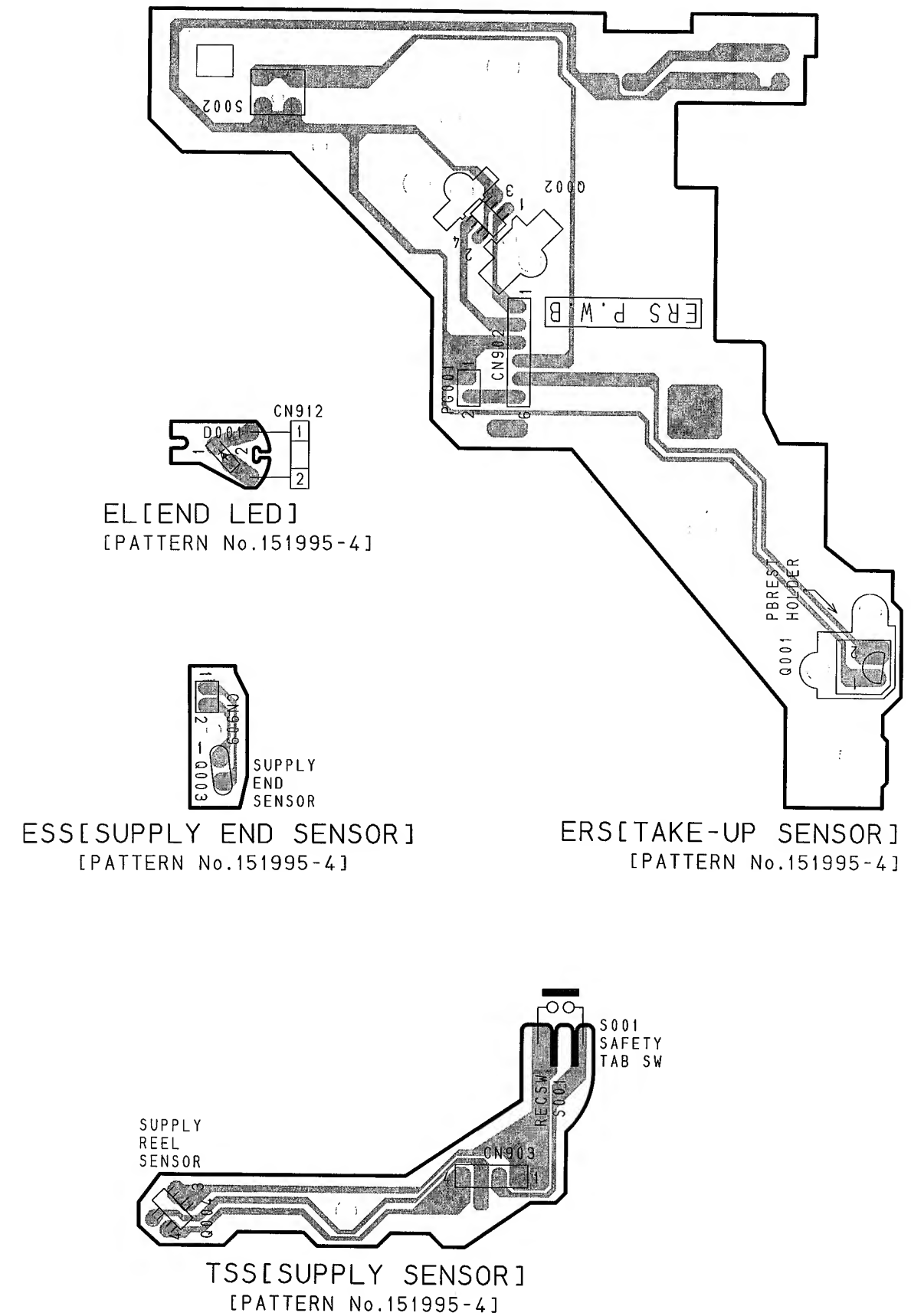
SPC [SENSOR/PROCESS]

Symbol No	Parts Location	Symbol No	Parts Location	Symbol No	Parts Location	Symbol No	Parts Location	Symbol No	Parts Location
<b>BL</b>		C1150	B-2B	<b>L</b>		R1133	B-1B	TL1306	A-4D
BL1101	A-1C	C1151	B-3B	L1101	A-1B	R1135	A-3D	TL1307	B-4D
BL1102	B-1B	C1152	B-3B	L1102	A-2A	R1139	A-4A	TL1308	A-4C
BL1811	A-1C	C1153	B-1B	L1103	A-2B	R1140	A-3D	TL1309	A-4C
BL1812	A-1C	C1154	B-2B	L1106	A-4B	R1141	A-3D	TL1311	A-4C
<b>C</b>		C1155	B-3A	L1109	A-1D	R1142	B-3D	TL1312	A-4C
C1001	B-1B	C1156	A-2D	L1110	A-2D	R1143	A-3D	TL1313	A-4C
C1002	A-3B	C1158	A-2E	L1116	B-1B	R1148	A-2C	TL1314	A-4C
C1003	A-2C	C1159	B-3D	L1117	B-1B	R1149	A-2C	<b>X</b>	
C1004	B-2B	C1160	A-1D	L1701	A-2B	R1150	A-2C	X1101	A-3A
C1005	A-1C	C1161	A-1D	<b>PG</b>		R1151	A-2C		
C1006	A-1C	C1162	B-2C	PG1015	B-1C	R1152	A-1D		
C1008	B-2B	C1163	B-2C	PG1017	A-4A	R1171	A-3D		
C1009	A-1C	C1166	A-2C	PG1018	A-2D	R1172	B-3A		
C1101	B-1B	C1167	A-2C	PG1019	A-1D	R1188	A-3B		
C1102	A-1B	C1168	B-2C	PG1301	B-4D	R1194	A-1D		
C1103	A-1B	C1169	B-1B	<b>Q</b>		R1201	A-3C		
C1104	A-1B	C1170	A-1C	Q1001	B-1B	R1202	B-3C		
C1106	B-1A	C1173	B-1B	Q1101	B-1A	R1203	B-3C		
C1107	A-1A	C1174	B-1B	Q1103	B-4B	R1204	A-3C		
C1108	B-2A	C1185	B-4B	Q1105	A-4B	R1205	B-3C		
C1109	A-1A	C1201	A-3C	Q1106	B-1B	R1206	B-3C		
C1110	B-2A	C1202	B-3C	Q1112	A-3B	R1207	A-4C		
C1111	B-1A	C1203	A-3C	Q1201	A-3C	R1208	B-4D		
C1113	B-1A	C1204	B-3C	Q1202	A-3C	R1209	B-4D		
C1114	A-1A	C1205	B-3C	Q1203	A-3C	R1210	B-4D		
C1116	B-2A	C1206	B-3C	<b>R</b>		R1211	B-4D		
C1117	B-2A	C1207	A-3C	R1001	B-1B	R1212	B-4D		
C1118	B-2A	C1208	B-4D	R1002	B-2B	R1213	B-4D		
C1119	B-2A	C1209	B-4C	R1003	A-1C	R1214	B-4C		
C1120	B-2B	C1210	B-4C	R1004	B-2B	R1215	B-4C		
C1121	B-2B	C1211	B-4C	R1011	B-2C	R1216	B-4C		
C1122	B-2B	C1212	B-3C	R1012	B-2C	R1217	B-4C		
C1123	B-4A	C1301	A-4E	R1102	B-1A	R1218	B-4C		
C1124	B-2B	C1302	A-4E	R1103	B-1A	R1219	B-4C		
C1125	B-2A	C1303	A-4D	R1104	B-1A	R1221	A-3C		
C1126	B-2A	C1304	B-4E	R1105	B-2B	R1222	A-4C		
C1127	A-3A	C1305	B-4D	R1106	B-2B	R1224	A-3C		
C1128	A-3A	C1311	A-4D	R1107	B-3A	R1225	A-3C		
C1129	A-3A	C1705	A-1C	R1108	B-2A	R1226	A-3C		
C1130	B-3A	<b>CP</b>		R1109	B-3A	R1301	B-3D		
C1131	B-3A	CP1101	A-4B	R1110	B-3A	R1302	B-3D		
C1133	B-4B	<b>D</b>		R1113	B-3A	R1303	B-3D		
C1134	B-4B	D1001	B-2C	R1114	B-4A	R1304	B-3D		
C1135	B-4B	D1101	B-2A	R1115	B-4A	R1322	A-3C		
C1136	B-4A	D1103	A-2A	R1116	A-4A	R1323	A-3C		
C1137	B-4A	D1104	A-2A	R1117	A-3B	R1330	B-2C		
C1138	A-4B	D1303	B-2C	R1118	A-3B	R1711	B-1D		
C1139	B-4B	<b>IC</b>		R1120	A-4B	R1801	B-1D		
C1141	A-2A	IC1001	B-2C	R1121	A-4B	R1802	B-1D		
C1142	A-3A	IC1101	B-1A	R1122	A-4B	R1813	A-2D		
C1143	A-2B	IC1102	B-2A	R1123	A-4B	R1814	A-2D		
C1144	B-4A	IC1103	B-3A	R1124	A-4B	<b>TL</b>			
C1145	B-4A	IC1104	B-3B	R1125	B-4B	TL1301	B-4D		
C1146	B-4A	IC1106	B-2D	R1126	B-4B	TL1302	A-4D		
C1147	B-4A	IC1107	A-3D	R1130	B-4A	TL1303	B-4D		
C1148	B-3A	IC1201	B-3C	R1131	B-4A	TL1304	A-4D		
C1149	B-2C	IC1301	B-4E	R1132	B-1B	TL1305	A-4D		

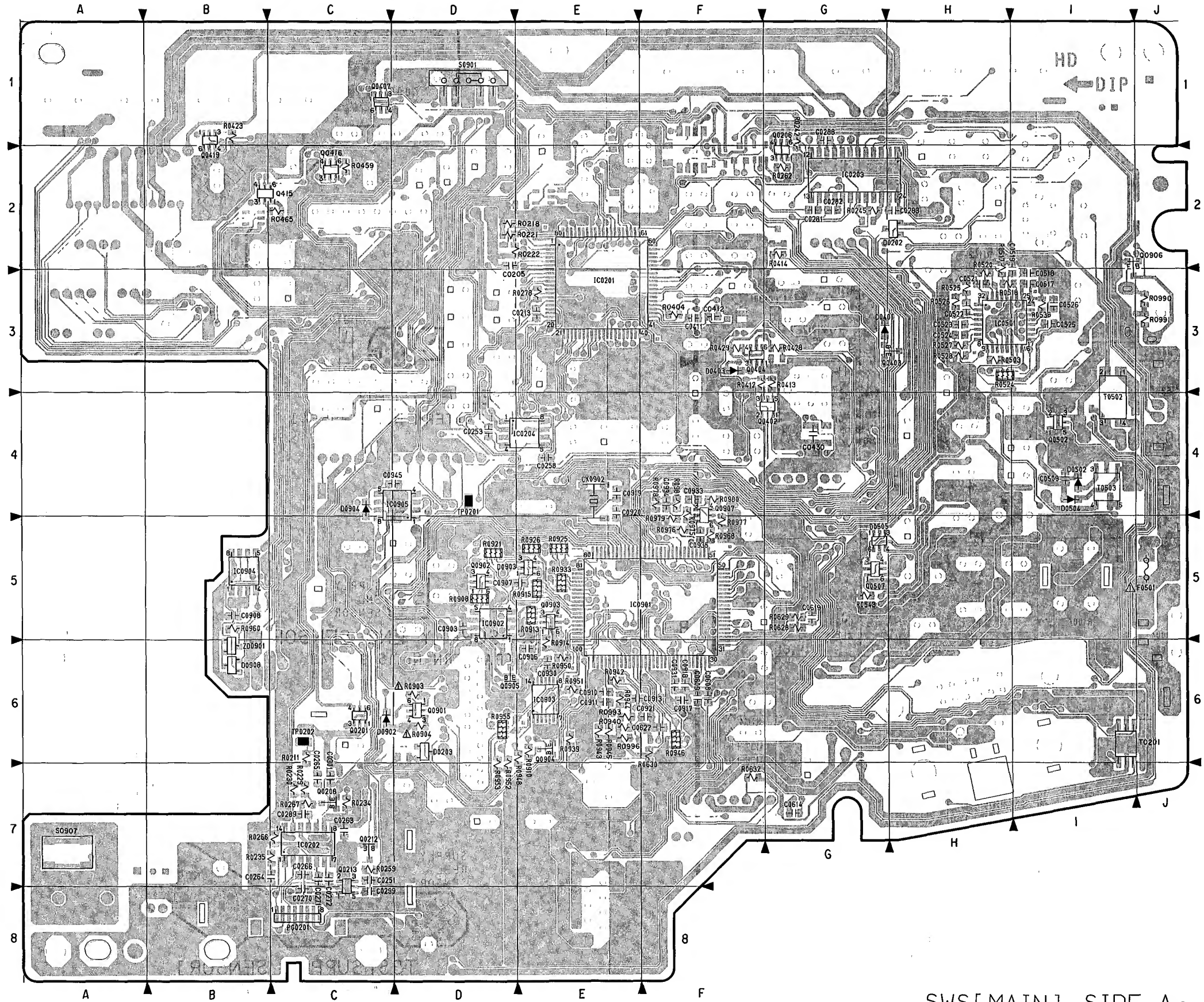




SPC[SENSOR/PROCESS]  
-SIDE B-  
[PATTERN No.JA1372-6]







SWS[MAIN] -SIDE A-  
[PATTERN No.JK1248-4]

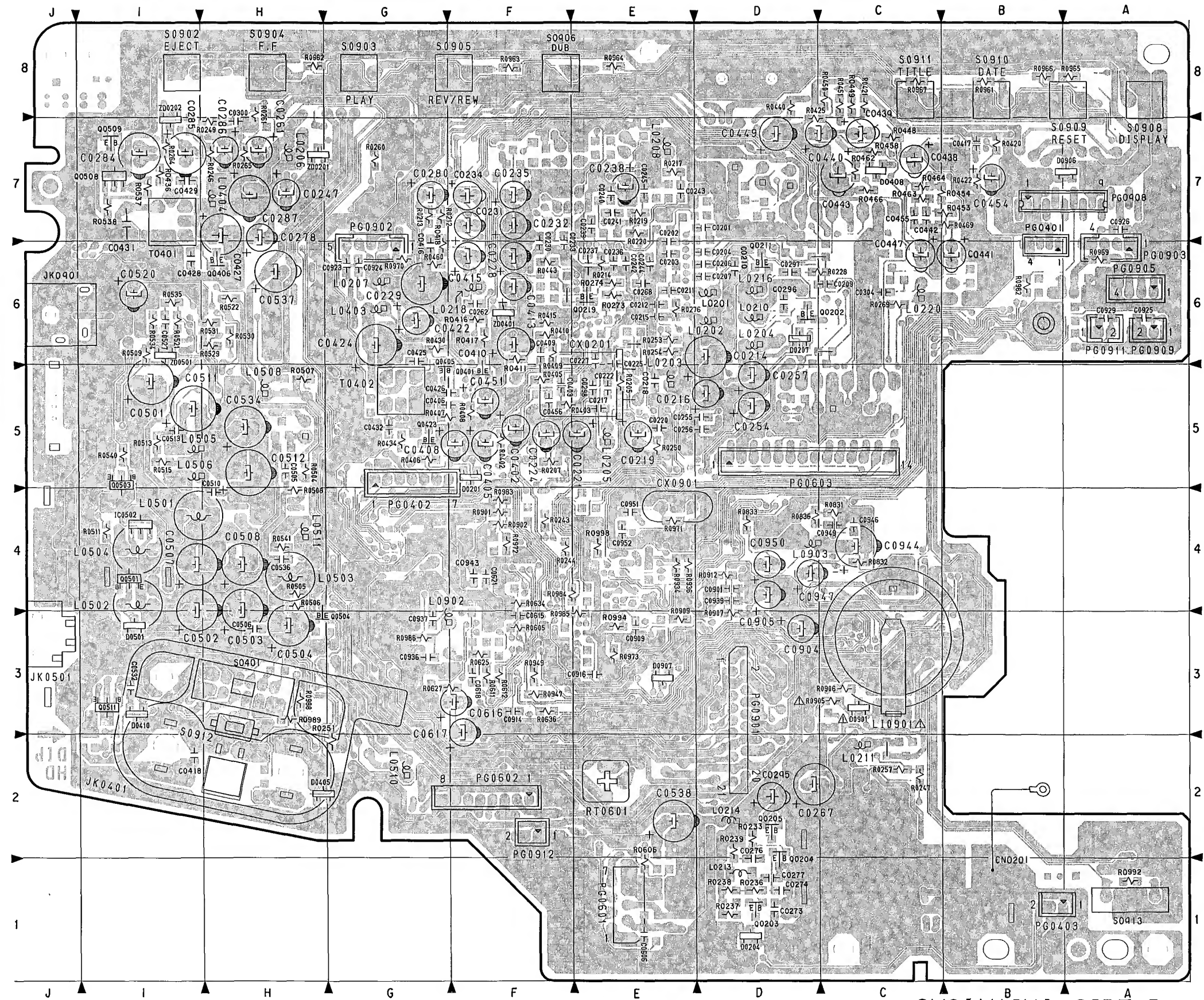
SWS [MAIN] 1/2

6 - 31

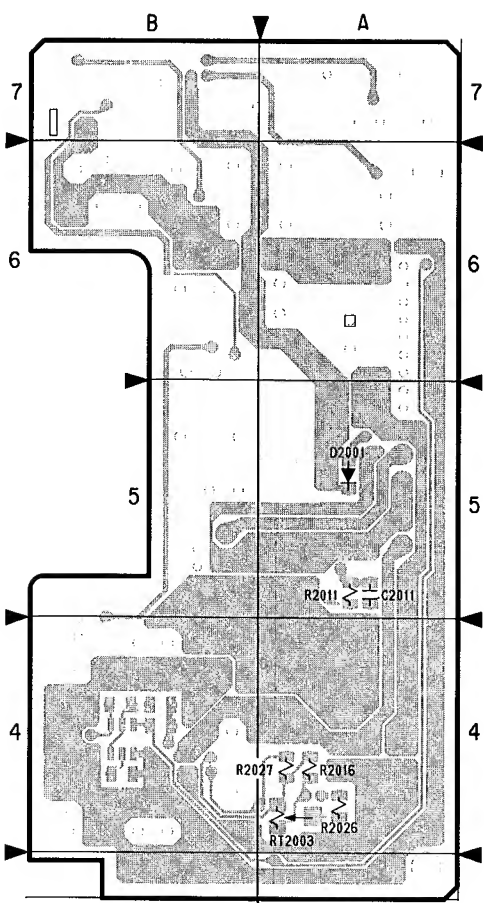
# SWS [MAIN] 2/2

Symbol No	Parts Location
R0977	A-5F
R0978	A-4F
R0979	A-5F
R0980	A-4F
R0981	A-4F
R0982	B-6B
R0983	B-4F
R0984	B-4F
R0985	B-3E
R0986	B-3G
R0988	B-3H
R0989	B-3H
R0990	A-3J
R0991	A-3J
R0992	B-1A
R0993	A-6E
R0994	B-3E
R0996	A-6E
R0998	B-4E
<b>RT</b>	
RT0601	B-2E
<b>S</b>	
S0401	B-3H
S0901	A-1D
S0902	B-8I
S0903	B-8G
S0904	B-8H
S0905	B-8F
S0906	B-8F
S0907	A-7A
S0908	B-8A
S0909	B-8A
S0910	B-8B
S0911	B-8C
S0912	B-3H
S0913	B-1A
<b>T</b>	
T0201	A-6I
T0401	B-7I
T0402	B-5G
T0502	A-4I
T0503	A-4I
<b>TP</b>	
TP0201	A-4D
TP0202	A-6C
<b>ZD</b>	
ZD0201	B-7H
ZD0202	B-8I
ZD0401	B-6F
ZD0501	B-6I
ZD0901	A-6B

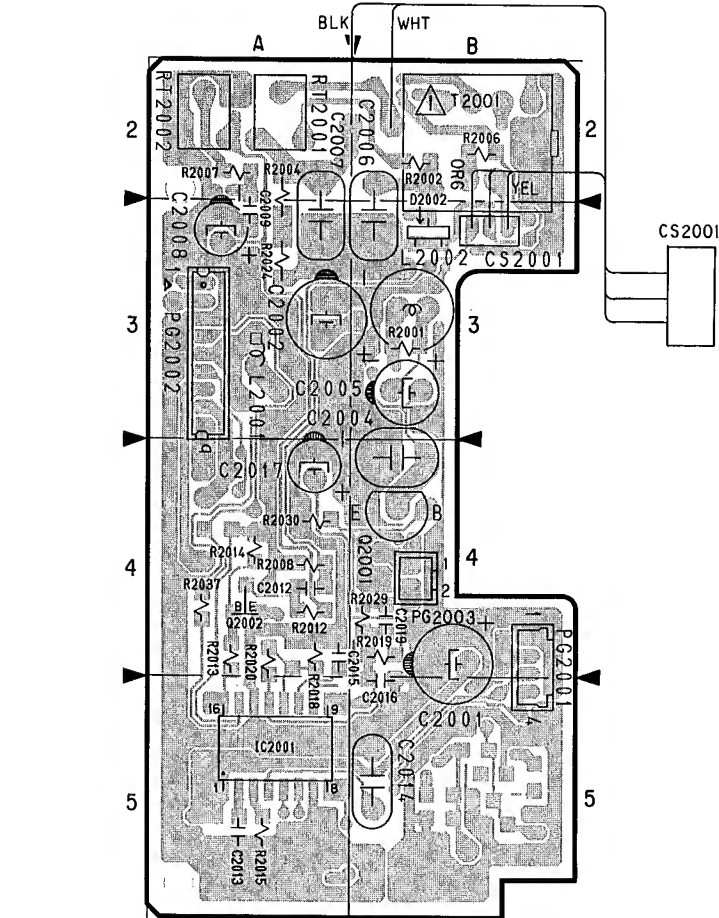




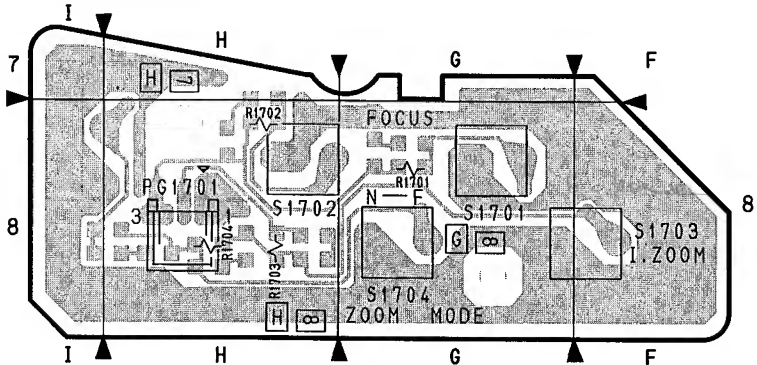
SWS[MAIN] -SIDE B-  
[PATTERN No.JK1248-4]



EVF[ELECTRONIC VIEWFINDER]  
-SIDE A-  
[PATTERN No. JK1248-4]



EVF[ELECTRONIC VIEWFINDER]  
-SIDE B-  
[PATTERN No. JK1248-4]



CON[CONTROL]  
[PATTERN No. JK1248-4]

IDENTIFICATION OF PARTS LOCATION

EVF [ELECTRONIC VIEWFINDER]

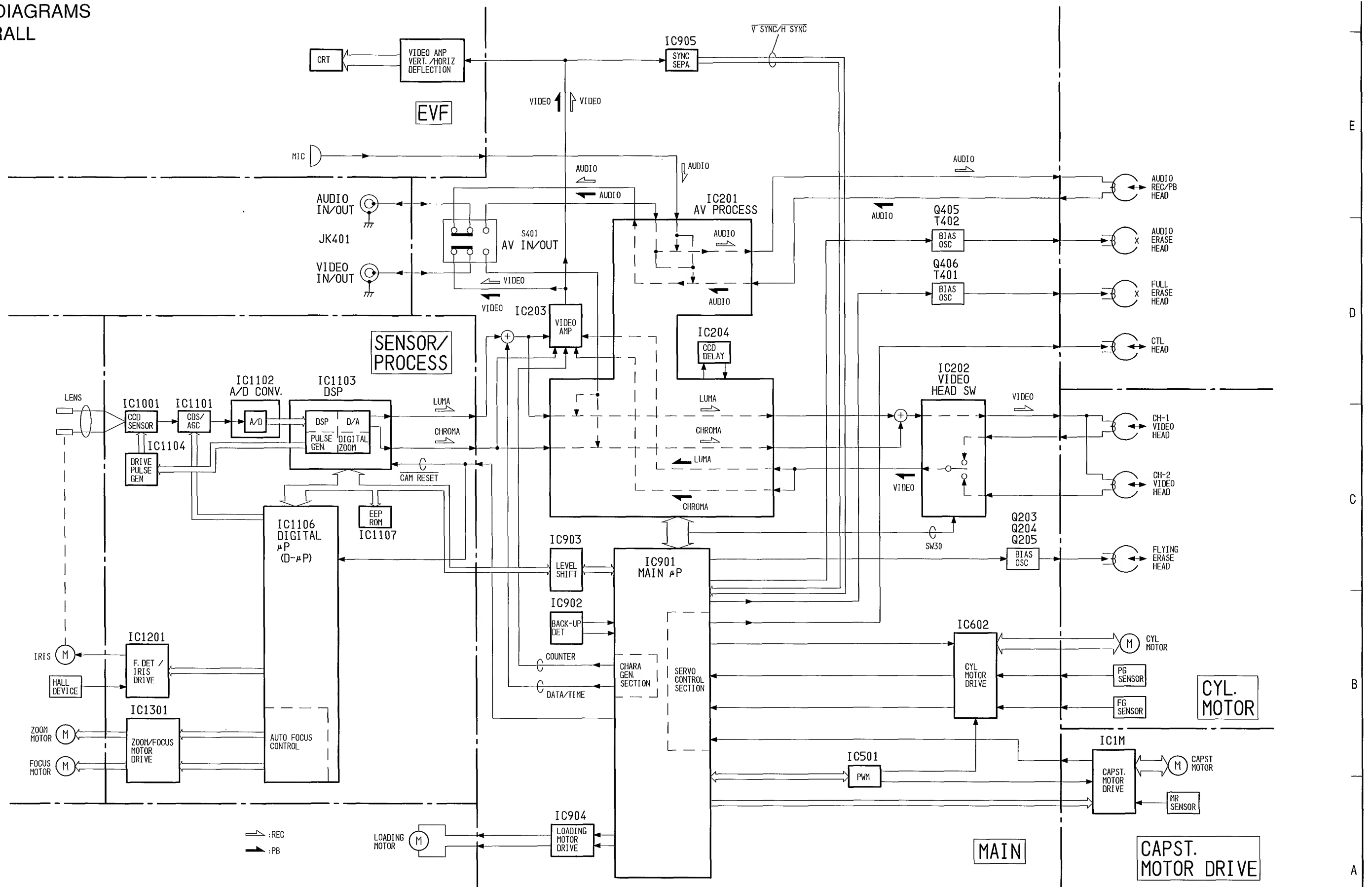
Symbol No	Parts Location
<b>C</b>	
C2001	B-4B
C2002	B-3A
C2004	B-4B
C2005	B-3B
C2006	B-3B
C2007	B-3A
C2008	B-3A
C2009	B-3A
C2011	A-5A
C2012	B-4A
C2013	B-5A
C2014	B-5B
C2015	B-4A
C2016	B-5B
C2017	B-4A
C2019	B-4B
<b>CS</b>	
CS2001	B-3B
<b>D</b>	
D2001	A-5A
D2002	B-3B
<b>IC</b>	
IC2001	B-5A
<b>L</b>	
L2001	B-3A
L2002	B-3B
<b>PG</b>	
PG2001	B-4B
PG2002	B-3A
PG2003	B-4B
<b>Q</b>	
Q2001	B-4B
Q2002	B-4A
<b>R</b>	
R2001	B-3B
R2002	B-2B
R2004	B-2A
R2006	B-2B
R2007	B-2A
R2008	B-4A
R2011	A-5A
R2012	B-4A
R2013	B-4A
R2014	B-4A
R2015	B-5A
R2016	A-4A
R2018	B-4A
R2019	B-4B
R2020	B-4A
R2024	B-3A
R2026	A-4A
R2027	A-4A
R2029	B-4B
R2030	B-4A
R2037	B-4A
<b>RT</b>	
RT2001	B-2A

CON [CONTROL]

Symbol No	Parts Location
<b>PG</b>	
PG1701	8H
<b>R</b>	
R1701	8G
R1702	8H
R1703	8H
R1704	8H
<b>S</b>	
S1701	8G
S1702	8H
S1703	8F
S1704	8G

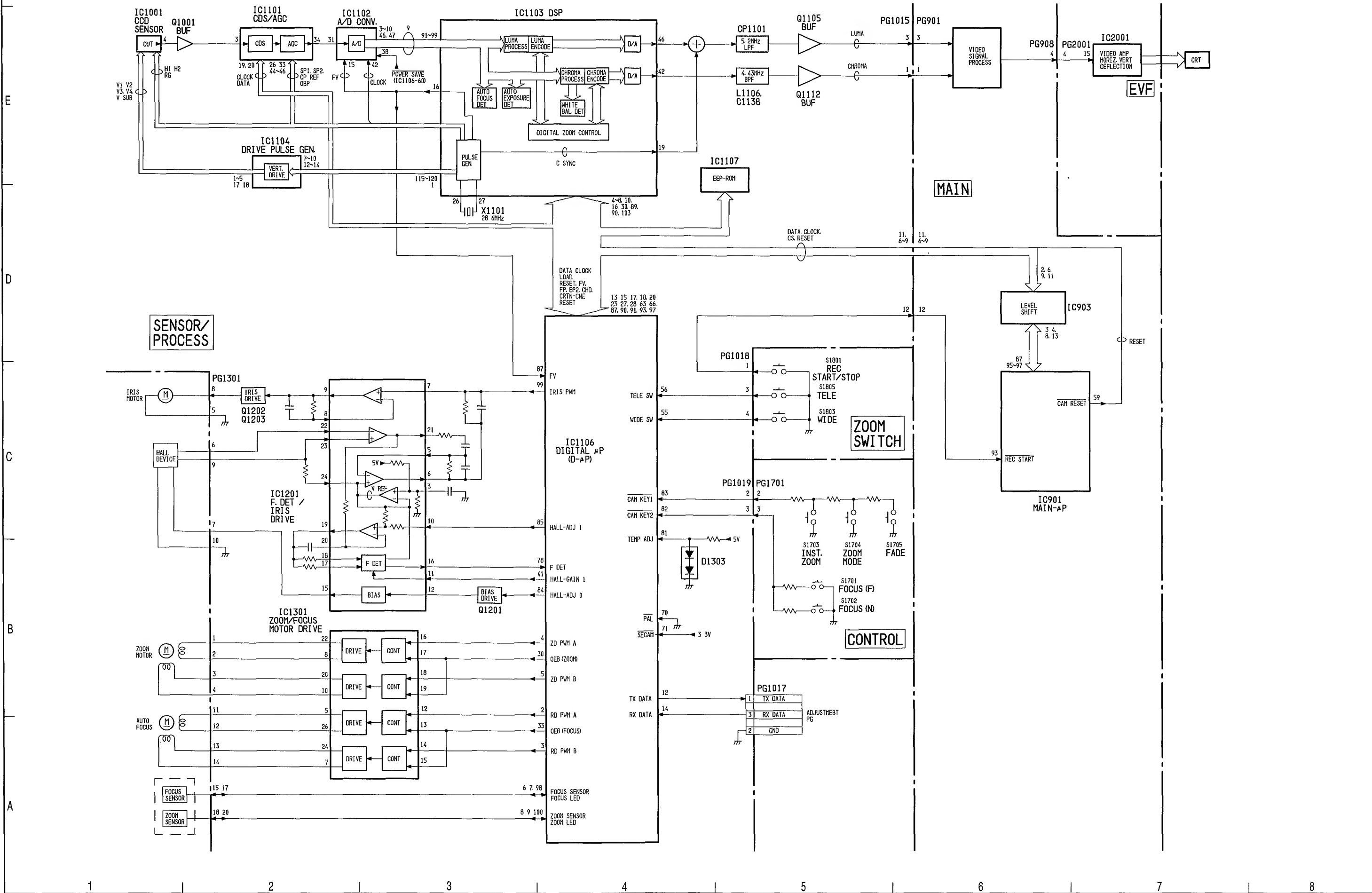
# BLOCK DIAGRAMS

## 1. OVERALL

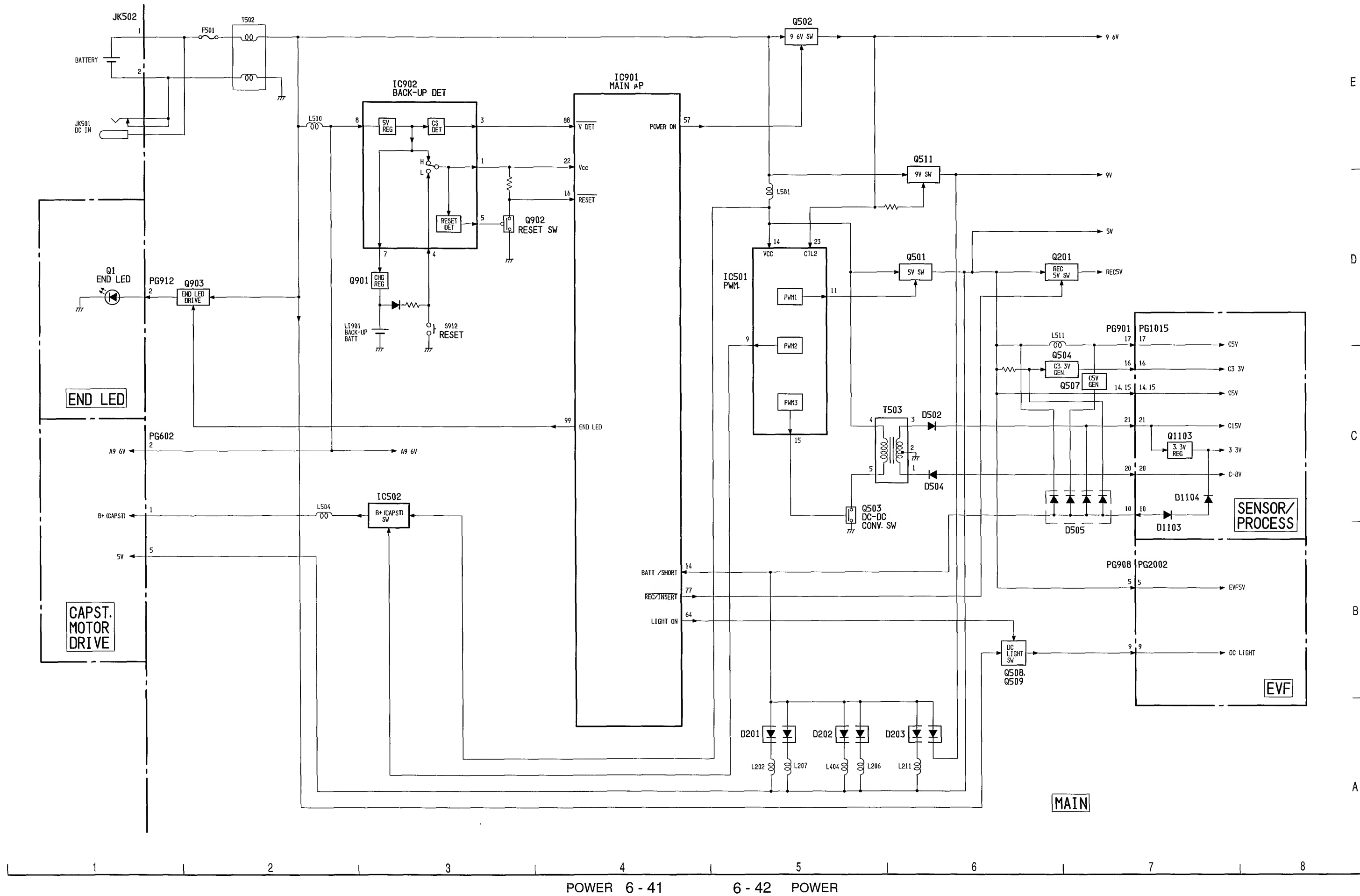




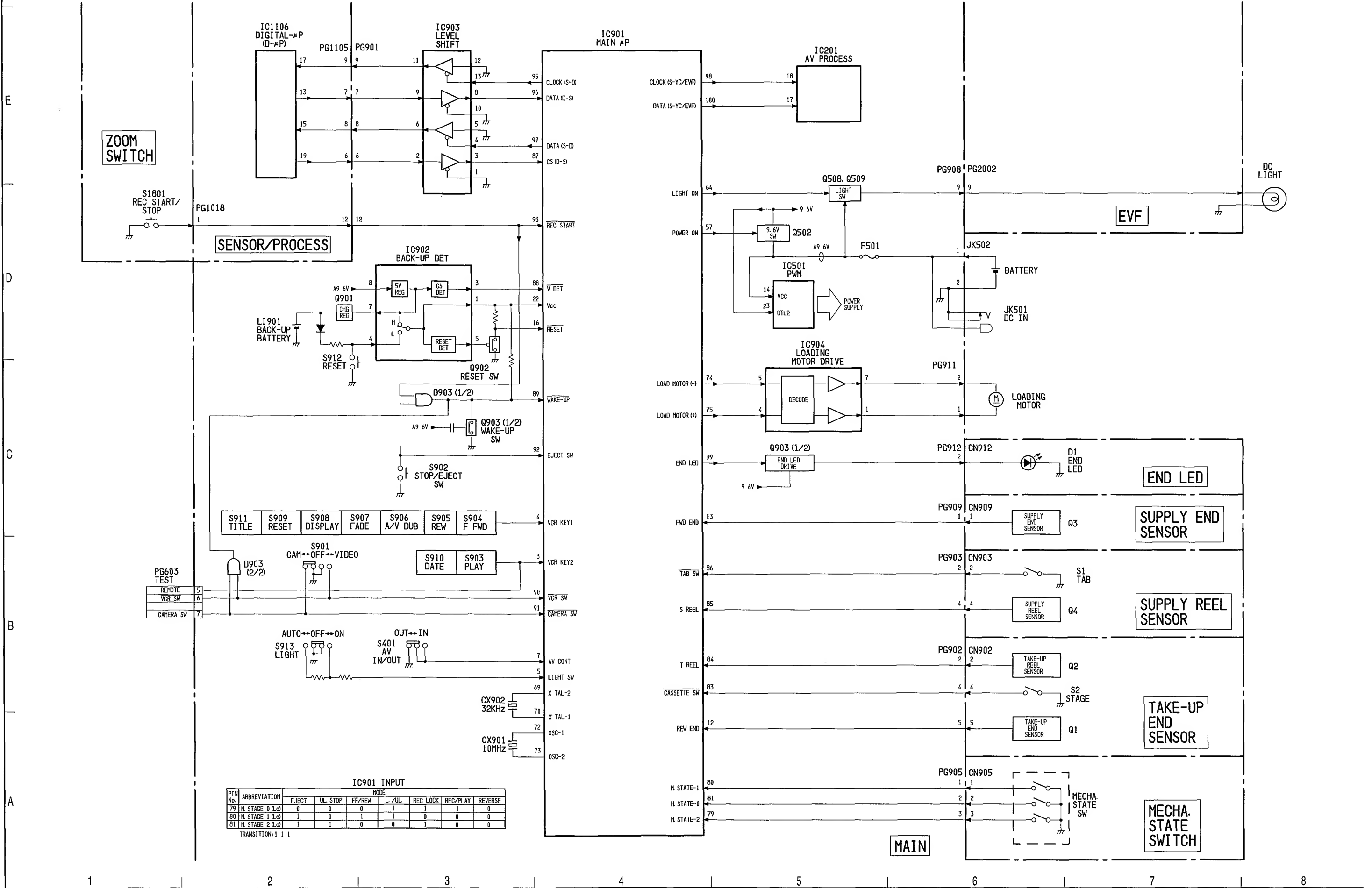
2. CAMERA



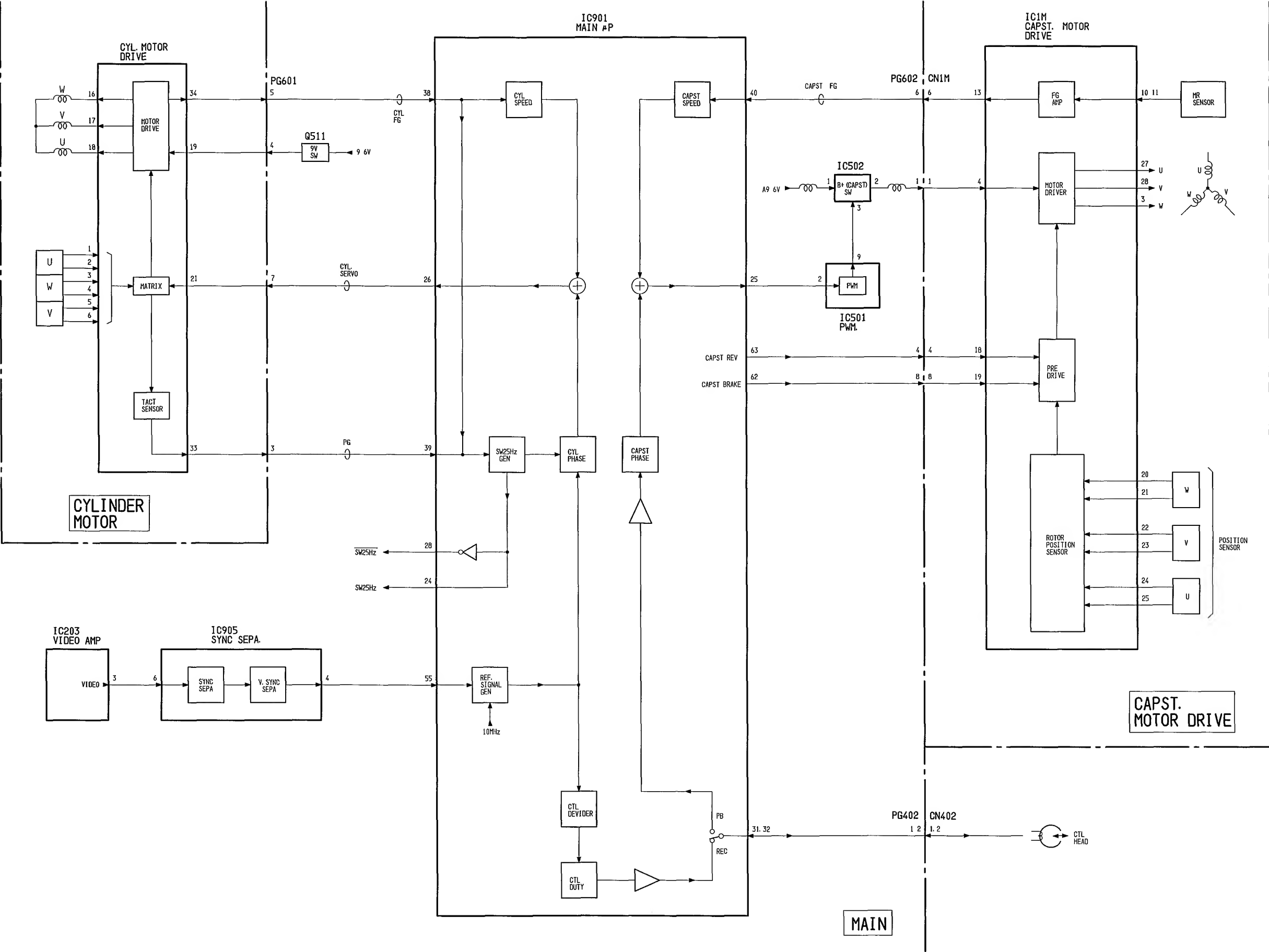
3. POWER



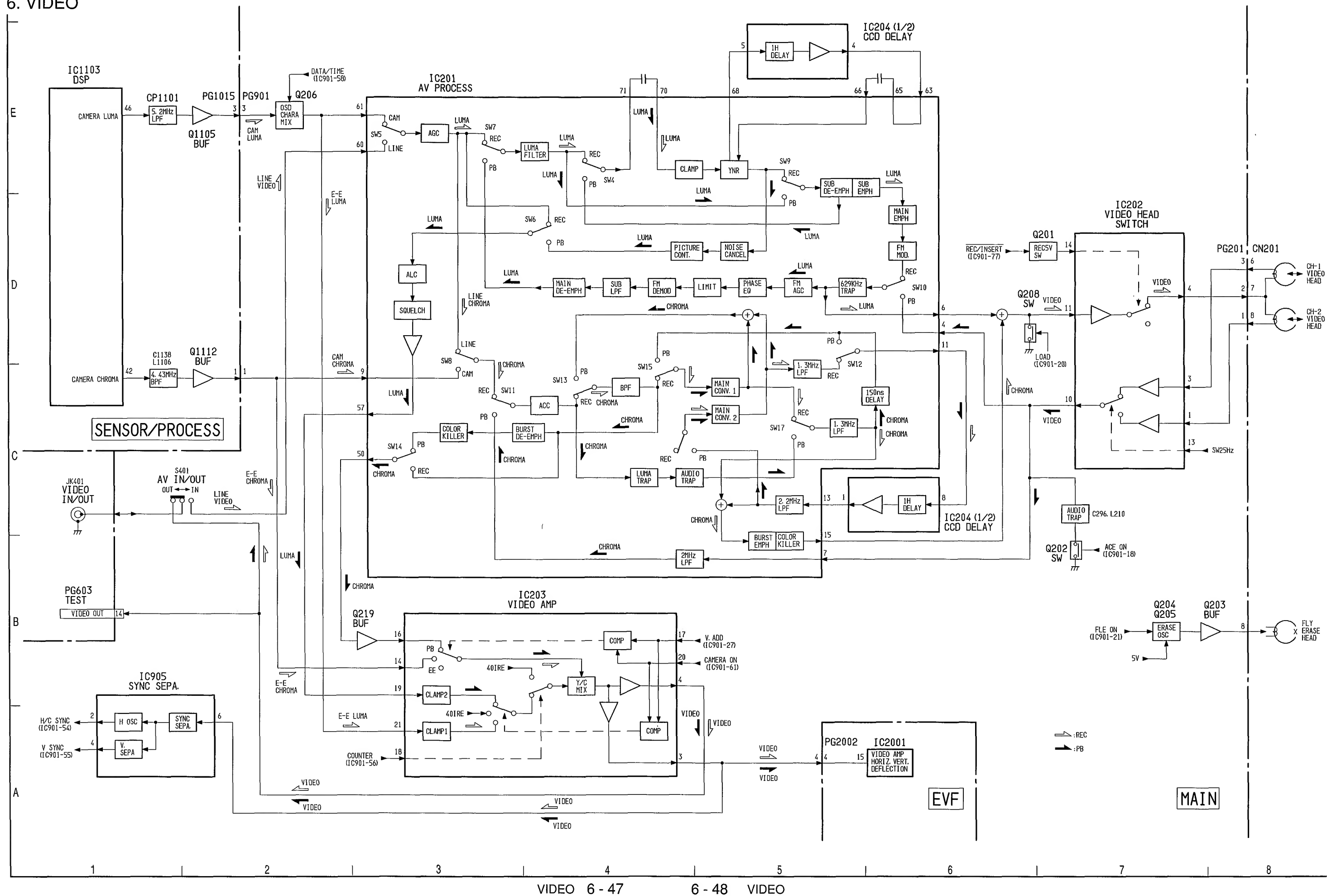
4. SYSTEM CONTROL

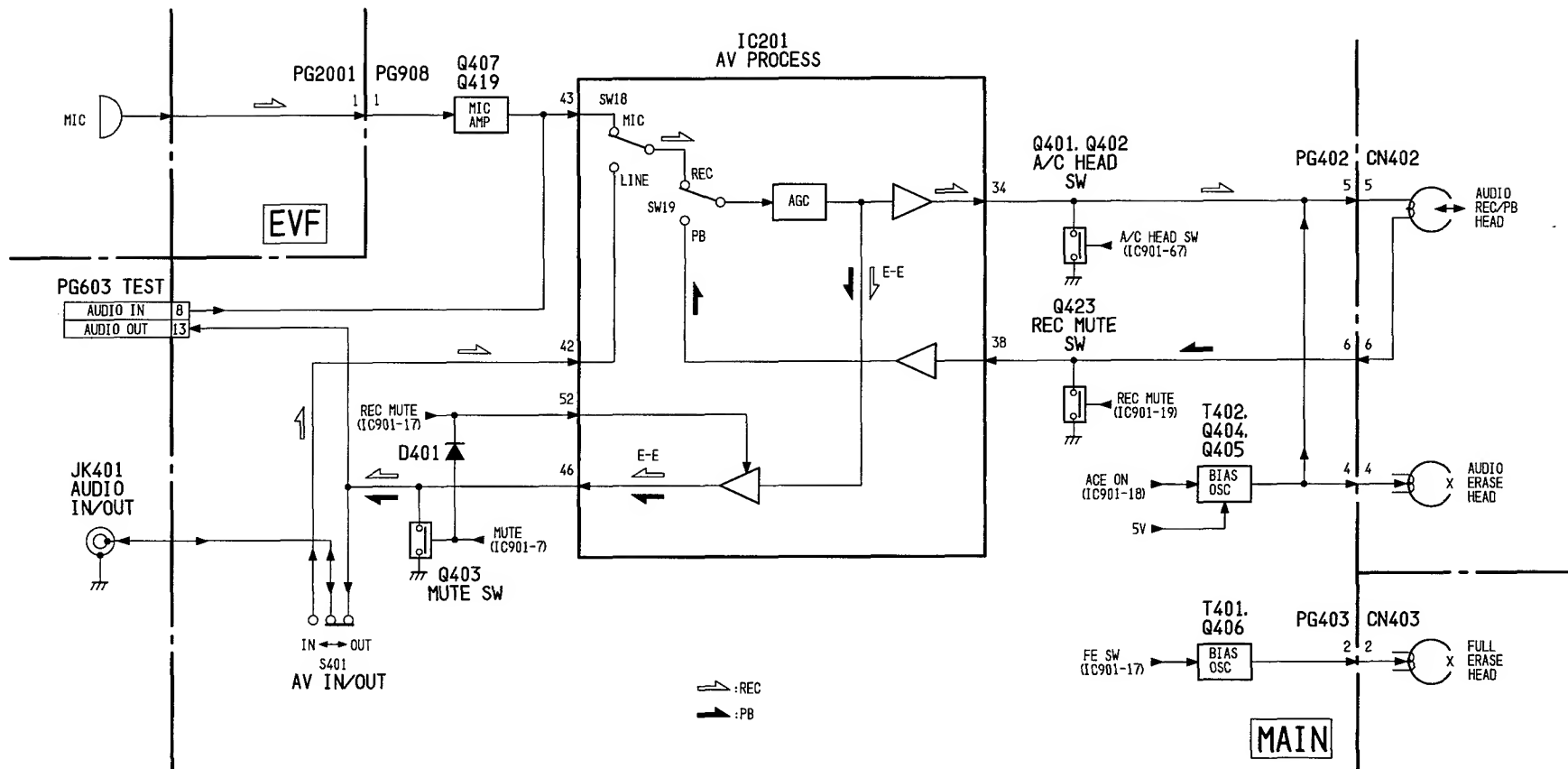


5. SERVO



# 6. VIDEO





-97-02-27 (1) CC/28/433/434/439/CG733/735 AUDIO BLOCK Rev.1-  
VH-7380E (AU/AV) AUDIO BLOCK 97.10.16 (1)

# MICROPROCESSOR PIN FUNCTION TABLES

## 1. DIGITAL MICROPROCESSOR (IC1106: D-μP)

Pin No.	I/O	Active Level	Abbreviation	Function
1	----	----	Vcc	3.3V power input.
2	O	(Pulse)	RD PWM A	Outputs reference PWM pulses to IC1301 (ZOOM/FOCUS MOTOR DRIVE).
3	O	(Pulse)	RD PWM B	
4	O	(Pulse)	ZD PWM A	
5	O	(Pulse)	ZD PWM B	Outputs reference PWM pulses to IC1301 (ZOOM/FOCUS MOTOR DRIVE).
6	O	(Pulse)	FOCUS LED1	Output pulses to drive the LEDs in the focus reset switches (FOCUS RESET SW).
7	O	(Pulse)	FOCUS LED2	
8	O	(Pulse)	ZOOM LED1	Output pulses to drive the LEDs in the zoom reset switches (ZOOM RESET SW).
9	O	(Pulse)	ZOOM LED2	
10	----	----	RESET[Lo]	Not used. Open.
11	----	----	Vss	Ground.
12	O	(Pulse)	TX DATA(SD)	Used for initial settings and adjustment. For data communications with personal computer.
14	I	(Pulse)	RX DATA(RD)	
13	O	(Pulse)	DATA(D-DSP/ROM/S)	For data communications with IC1102 (DSP), IC1107 (EEP-ROM) and IC901 (MAIN-μP).
15	I	(Pulse)	DATA(DSP/ROM/S-D)	
17	O	(Pulse)	CLOCK(D-DSP/ROM/S)	
16	----	----	----	Not used. Open.
18	O	Lo	LOAD[Lo] (D-DSP)	Activates data communications with IC1102 (DSP).
19	O	Lo	CS-MB[Lo]	Activates data communications with IC901 (MAIN-μP).
20	O	(Pulse)	CS-MA	Activates data communications with IC901 (MAIN-μP).
21	----	----	----	Not used. Open.
22	----	----	Vss	Ground.
23	----	----	LOAD[Lo] (D-ROM)	Activates data communications with IC1107 (EEP-ROM).
24	----	----	----	Not used. Open.
25	----	----	----	
26	----	----	----	
27	O	(Pulse)	CLOCK(D-CDS)	Transfer data to IC1101 (CDS/AGC).
28	O	(Pulse)	DATA(D-CDS)	
29	----	----	----	Not used. Open.
30	O	(Pulse)	OEB(ZOOM)	Activates data communications with IC1301 (ZOOM MOTOR DRIVE).
31	----	----	----	Not used. Open.
32	----	----	----	
33	O	(Pulse)	OEB(FOCUS)	Activates data communications with IC1302 (FOCUS MOTOR DRIVE).
34	----	----	----	Not used. Open.
35	----	----	Vcc	3.3V power input.
36	----	----	----	Not used. Open.
37	O	Hi	TALLY	
38	O	Hi	RESET V.GYRO	
39	O	Hi	RESET H.GYRO	
40	O	Hi	HALL GAIN 0	
41	O	Hi	HALL GAIN 1	Control the amplification (gain of hall device) in IC1201 (F.DET/IRIS DRIVE).
42	----	----	----	Not used. Open.
43	----	----	----	
44	----	----	Vss	Ground.
45	----	----	----	Not used. Open.
46	----	----	----	
47	----	----	----	
48	----	----	----	
49	----	----	----	
50	----	----	----	

Pin No.	I/O	Active Level	Abbreviation	Function
51	-----	-----	-----	Not used. Open.
52	-----	-----	-----	
53	-----	-----	-----	
54	I	Lo	T/W FAST	Low-speed zoom detection input.
55	I	Lo	WIDE SW[Lo]	Zoom switch detection inputs.
56	I	Lo	TELE SW[Lo]	
57	-----	-----	Vss	Ground.
58	-----	-----	-----	Not used. Open.
59	-----	-----	-----	
60	O	Lo	POWER SAVE [Lo]	Outputs "Lo" in modes other than camera recording to inhibit the operation of each circuit, thus reducing the power consumption.
61	-----	-----	-----	Not used. Open.
62	I	Hi	STAND-BY[Lo]	Not used. Connected to 3.3V power supply.
63	I	Hi/Lo	RESET	Reset signal input from IC901 (MAIN-μP).
64	I	Hi	MN[Lo]	Not used. Connected to 3.3V power supply.
65	-----	-----	Vss	Ground.
66	I	(Pulse)	CLOCK	Clock pulse input from IC1102 (DSP).
67	-----	-----	-----	Not used. Open.
68	-----	-----	Vcc	3.3V power input.
69	O	Hi	SECAM SW	Not used. Open.
70	I	Hi	PAL[Lo]	Microprocessor internal mode select input. Connected to ground.
71	I	Hi	SECAM[Lo]	Not used. Connected to 3.3V power supply.
72	I	Hi	Hi-BAND	
73	I	Lo	MO0	Not used. Ground.
74	I	Hi	MO1	Not used. Connected to 3.3V power supply.
75	I	Hi	MO2	
76	-----	-----	AVcc	5V power input (for analog circuits in microprocessor).
77	-----	-----	V.REF	A/D reference voltage input (connected to 5V power supply).
78	I	0V-5V	F.DET	F-value detection input. Receives the F.DET voltage detected by IC1202 (F.DET) and compares this with the reference voltage input via pin 77 to detect the F-value.
79	I	0V-5V	V.MOVE	Not used. Ground
80	I	0V-5V	H.MOVE	
81	I	0V-5V	TEMP-ADJ.	Temperature change detection input. Detects variations in the forward voltage at the connected diode to correct the back-focus.
82	I	0V-5V	CAM KEY2	Camera switch detection input (DC Light).
83	I	0V-5V	CAM KEY1	Camera switch detection input (fade, cinema mode, instant zoom).
84	O	0V-5V	HALL-ADJ.0	Drives Q1201 (HALL BIAS) to control the bias voltage of the Hall devices.
85	O	0V-5V	HALL-ADJ.1	Controls the offset voltage of IC1201 (F. DET/IRIS DRIVE).
86	-----	-----	AVss	Ground.
87	I	(Pulse)	FV	Receives the vertical sync pulses that detect the iris detection area, from IC1102 (DSP).
90	I	(Pulse)	FP	Field discrimination pulse input.
91	I	(Pulse)	EP2	Receives pulses which discriminate the iris detection area.
93	I	(Pulse)	CHD	Horizontal sync input.
88	I	Lo	NEAR-SW[Lo]	Not used. Connect to 3.3V power supply.
89	I	Lo	FAR-SW[Lo]	
92	-----	-----	Vss	Ground.
94	-----	-----	-----	Not used. Open.
95	-----	-----	-----	
96	-----	-----	-----	
97	O	(Pulse)	CRTN-CNE	Supplies pulses to IC1102 (DSP) to control the wipe fade operation.
98	I	(Pulse)	FOCUS SENSOR	Focus motor position detection input.
99	O	(Pulse)	IRIS PWM	Iris motor drive output.
100	I	(Pulse)	ZOOM SENSOR	Zoom motor position detection input.



## 2. MAIN MICROPROCESSOR (IC901: MAIN-μP)

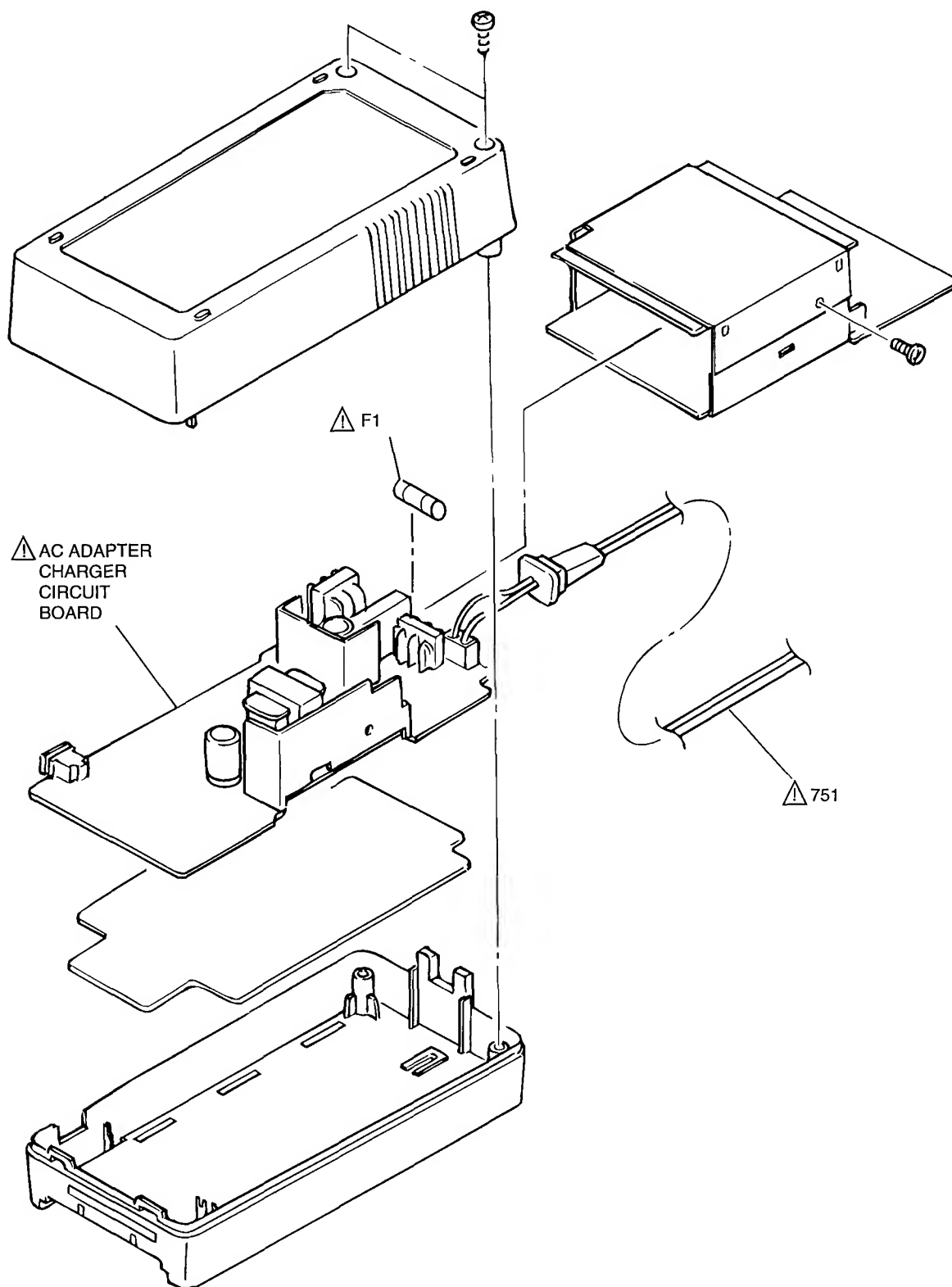
Pin No.	I/O	Active Level	Abbreviation	Function
1	O	(Pulse)	CS(S-EVF)	Not used. Open.
98	O	(Pulse)	CLOCKS-YC/EVF)	
100	O	(Pulse)	DATA(S-YC/EVF)	
2	----	-----	GND	Grounded.
3	I	0V-5V	VCR KEY-1	Detect the key operations using the analog-to-digital conversion.
4	I	0V-5V	VCR KEY-2	
5	I	0V-5V	LIGHT SW	Detects the position of the LIGHT switch.
6	I	0V-5V	S-LOCK+ S-EDIT	Switches the search lock/non-lock and synchro edit functions.
7	I	Hi	AV CONT.	Detects the position of the AV IN/OUT switch.
8	I	Hi/Lo	PAL[Lo]/SECAM	Microprocessor internal mode select input. Connected to ground via resistor.
9	O	Hi/Lo	PAL[Lo]/ MESECAM	
10	----	-----	-----	
11	I	0V-5V	SW POINT	For the connection of a variable resistor that adjusts the head switching point.
12	I	Lo	REW END[Lo]	Detects the tape end during rewind and rewind search modes.
13	I	Lo	FWD END[Lo]	Detects the tape end during record, playback, fast forward and forward search modes.
14	I	0V-5V	BATT/SHORT	Detects the battery remaining levels to display it in the EVF and detects the short-circuit of the power supplies.
15	----	-----	Vcc	Connected to 5V.
16	I	Lo	RESET[Lo]	Input to reset the main microprocessor. When "Lo" is applied, the main microprocessor is initialized.
17	O	Hi	FE SW	Activates the full erase head.
18	O	Hi	A/C ERASE	Activates the erase head on the audio/control head.
19	O	Hi	REC MUTE	Mutes the audio signal during modes other than play.
20	O	Hi	LOAD	Stops the recording of the video signal.
21	O	Hi	FLE ON	Turns the flying erase head on for 5 seconds when the PAUSE switch is pressed during recording.
22	----	-----	Vcc	Connected to 5V.
23	----	-----	-----	Not used. Open.
24	O	(Pulse)	SW30/25Hz	Head switching pulse output.
25	O	(Pulse)	CAPST. PWM	Capstan motor control signal output.
26	O	(Pulse)	CYL. PWM	Cylinder motor control signal output.
27	O	(Pulse)	V.ADD	Artificial V (vertical) sync pulse output. This pulse is output in the still play mode.
28	O	(Pulse)	SW30/25Hz[Lo]	Inverted head switching pulse output.
29	----	-----	HEAD AMP SW	Not used. Open.
30	----	-----	COMP	Not used. Connected to ground.
31	I/O	(Pulse)	CTL(+)	CTL pulse output/input. Connected to CTL head.
32	I/O	(Pulse)	CTL(-)	
33	----	-----	GND	Grounded.
34	----	-----	CTL SW	Not used. Open.
35	I	Lo	CTL AMP(-)	Input terminals of the CTL amplifier in the IC901.
36	I	Hi	CTL AMP(+)	
37	O	(Pulse)	CTL OUT	CTL pulse output. Connected to TP601 (test point) and PG603-4 (test plug)
38	I	(Pulse)	CYL. FG	CYL. FG pulse input.
39	I	(Pulse)	CYL. PG	CYL. PG pulse input.
40	I	(Pulse)	CAPST. FG	CAPST. FG pulse input.
41	----	-----	Vcc	Connected to 5V.
42	----	-----	Vcc	
43	----	-----	-----	Not used. Open.
44	----	-----	V.REF	
45	----	-----	-----	
46	----	-----	-----	
47	----	-----	-----	

Pin No.	I/O	Active Level	Abbreviation	Function
48	-----	-----	-----	Not used. Open.
49	-----	-----	GND	Grounded.
50	I	(Pulse)	OSC IN	Generates OSD clock pulse by the resisto (R986), coil (L902) and capacitors (C936, C937).
51	O	(Pulse)	OSC OUT	
52	O	(Pulse)	2fsc OUT	2fsc(7.16MHz) pulse input.
53	I	(Pulse)	2fsc IN	
54	I	(Pulse)	H/C SYNC	Horizontal sync pulse input.
55	I	(Pulse)	V SYNC	Vertical sync pulse input.
56	O	(Pulse)	COUNTER	OSD (counter) signal output.
57	O	Hi	POWER ON	Turns the switching regulator on to activate the camera block and VCR block.
58	O	(Pulse)	DATE/TIME	OSD (date/time) signal output.
59	O	Lo	CAM RESET [Lo]	Output "Lo" when the power is turned of to initialize the digital microprocessor (IC1106) and digital signal processor (IC1102).
60	-----	-----	-----	Not used. Open.
61	O	Lo	CAMERA ON [Lo]	When the camera block is turned on, this pin outputs "Lo" to change over the switch in the video amp (IC203) to "CAMERA".
62	O	Hi	CAPST.BRAKE	Disables the output of the capstan servo in the fast forward and rewind modes and stops the capstan motor in the stop and pause modes.
63	O	Hi	CAPST.REV	Reverses the tape in the rewind and reverse search modes.
64	O	Hi	LIGHT ON	Output "Hi" controlled by the voltage at pin 5, and drives the DC light switch (Q509: DC LIGHT SW) to turn the DC light on.
65	O	Hi	MUTE	Mutes the audio signals.
66	O	(Pulse)	T.FADE	Outputs a signal when the FADE button is pressed. (Open for models without the FADE function.)
67	O	Hi	A/C HEAD SW	Controls the audio/control (A/C) head switches (Q401, Q402: A/C HEAD SW) to supply the signal to the A/C head.
68	-----	-----	-----	Not used. Connected to ground.
69	I	(Pulse)	X'TAL-2	Generates 32kHz clock pulse by the crystal oscillator (CX902: 32kHz) for backup of the 8MHz clock pulse.
70	O	(Pulse)	X'TAL-1	
71	-----	-----	GND	Grounded.
72	-----	(Pulse)	OSC-1	Generates 10MHz clock pulse by the oscillator(CX901 10MHz) in the power on mode.
73	I	(Pulse)	OSC-2	
74	O	Hi	LOAD MOTOR (-)	Control the loading motor.
75	O	Hi	LOAD MOTOR (+)	
76	O	Lo	PB[Lo]	Generates the PB5V in the preamp circuit.
77	O	Lo	REC/INSERT [Lo]	Generates the REC5V (REC/INSERT 5V) in the preamp circuit.
78	-----	-----	-----	Not used. Connected to 5V via resistor.
79	I	Lo	M.STATE-2[Lo]	Detect the mechanism state.
80	I	Lo	M.STATE-1[Lo]	
81	I	Lo	M.STATE-0[Lo]	
82	-----	-----	-----	Not used. Connected to 5V via resistor.
83	I	Lo	CASSETTE SW[Lo]	Detects the position of the cassette holder.
84	I	(Pulse)	T.REEL	Calculates the tape remaining time, counts up the tape counter and detects the reel lock.
85	I	(Pulse)	S.REEL	Calculates the tape remaining time.
86	I	Lo	TAB SW[Lo]	Detects whether the tab is present or not to avoid accidental erasing.
87	I	(Pulse)	CS(D-S)	Communicate with the digital microprocessor (IC1106).
95	I	(Pulse)	CLOCK(S-D)	
96	I	(Pulse)	DATA(D-S)	
97	O	(Pulse)	DATA(S-D)	
88	I	Lo	V.DET[Lo]	Detects disconnection of the battery or the AC adapter and enters the backup mode.

Pin No.	I/O	Active Level	Abbreviation	Function
89	I	Lo	WAKE-UP[Lo]	Changes the clock pulse to 8MHz from 32kHz when the EJECT switch is pressed, when the CAMERA/VCR switch is set to on or when the cassette holder is closed.
90	I	Lo	VCR SW[Lo]	Detects the position of the CAMERA/VCR switch to enter the VCR mode.
91	I	Lo	CAMERA SW [Lo]	Detects the position of the CAMERA/VCR switch to enter the CAMERA mode.
92	I	Lo	EJECT SW[Lo]	Detects the operation of the EJECT switch to eject the cassette.
93	I	Lo	REC START[Lo]	Detects the operation of the REC START/STOP switch.
94	-----	-----	-----	Not used. Open.
99	O	(Pulse)	END LED	Lights the end LED to detect the tape end.

# CHAPTER 7 VM-ACV23E (AC ADAPTER/CHARGER)

## 1. EXPLODED VIEW & REPLACEMENT PARTS LIST



SYMBOL	NO	P-NO	DESCRIPTION
△	751	EV10441	CORD, POWER
△	F1	4115881	FUSE 1.6A

1

2

3

4

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